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Contents

Page

New data on the distribution of <i>Mesobuthus eupeus thersites</i> (C.L. Koch, 1839) (Scorpiones: Buthidae) in Central Kazakhstan	
Tatyana M. Bragina & Ersen Aydın Yağmur	1
The fragmented peri-Saharan distribution of the subgenus <i>Pandinurus</i> Fet, 1997 with the description of a new species from Chad (Scorpiones, Scorpionidae, <i>Pandinus</i>)	
Andrea Rossi	6
The first record of family Segestriidae Simon, 1893 (Araneae: Dysderoidea) from Iran	
Alireza Zamani	15
A new record for the araneofauna of Turkey (Araneae: Salticidae)	
Hüseyin Allahverdi & Gökhan Gündüz	19
Preliminary list of spiders and other arachnids of Saudi Arabia (Except ticks and mites)	
Hisham K. El-Hennawy	22
Life cycle of <i>Uroctea limbata</i> (C.L. Koch, 1843) in Egypt (Araneae: Oecobiidae)	
Gihan M.E. Sallam, Nahla A.I. Abd El-Azim & Mohammad A. Mohafez	59

Volume 14 (2014-2015)

Back issues: Vol. 1 (1987-1990), Vol. 2 (1990-1992), Vol. 3 (1992-1993), Vol. 4 (1994-1996), Vol. 5 (1996-1997), Vol. 6 (1998-2000), Vol. 7 (2000-2001), Vol. 8 (2002-2003), Vol. 9 (2004-2005), Vol. 10 (2006-2007), Vol. 11 (2008-2009), Vol. 12 (2010-2011), Vol. 13 (2012-2013).

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**New data on the distribution of *Mesobuthus eupeus thersites*
(C.L. Koch, 1839) (Scorpiones: Buthidae)
in Central Kazakhstan**

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Abstract

New data on the distribution of *Mesobuthus eupeus thersites* (C.L. Koch, 1839) (Buthidae) in Central Kazakhstan is presented. It is one of the most northern areas where this species was found in Asia. The species was collected in the south of Kostanay Province in the new protected area, Altyn Dala State Reservat (protected area established in 2012). The map with data of this species' distribution in Kazakhstan and in new areas is given with photographs.

Keywords: *Mesobuthus eupeus thersites*, distribution, scorpions, Kazakhstan.

Introduction

Mesobuthus eupeus thersites (C.L. Koch, 1839) is the most widespread scorpion in Kazakhstan. The data about its distribution in this country was summarized by Gromov (2001), with additional data by Fomichev (2011). The northernmost boundary of its range in Asia was registered in the Orenburg Province (Russia) at 51°13'N, 57°75'E (Fet, 2010), and in Kazakhstan, at 49°42'N, 82°32'E (Gromov, 2001). In the spring and summer of 2013, *M. e. thersites* (C.L. Koch, 1839) was found in the southern part of Kostanay Province at 49°17'N, 65°14'E (Fig. 1). Some studies were published about spider fauna of Kostanay Province (Bragina, 2011, 2012), but the data on the scorpion fauna in this region is given for the first time.

Material and Methods

The first specimen of *Mesobuthus eupeus thersites* was collected on May 2013 in a house by hand in the old winter camp (now an old house used by the Reservat workers). Other specimens were collected by T.M. Bragina in the natural habitats of the Altyn Dala State Natural Reservat and near its boundaries by 500 ml plastic pitfall traps in June-July 2013 and preserved in 70% ethanol. Collected material was identified by E.A. Yağmur and deposited in the collection of the Zoology Museum of Alaşehir Vocational School, Celal Bayar University, Manisa, Turkey (AZM).

The studied area is located in Zhangeldy and Amangeldy Districts of Kostanay Province, Kazakhstan, within Altyn Dala State Natural Reservat. According to the environmental laws of the Republic of Kazakhstan, Reservat differs from Reserve as that it includes an allocated buffer zone for research experiments, recreation and eco-tourism. In Altyn Dala State Reservat, about 35% of the area is allocated for these purposes. The data of localities and habitats in which scorpions were found are given below.



Fig. 1. *Mesobuthus eupeus thersites* distribution in Kazakhstan.

Symbols used: ● - Gromov (2001), ▲ - Fomichev (2011), ★ - new data, — boundaries of sites of the protected area (Altyn Dala State Natural Reservat).

Results

Systematics: Fet & Lowe (2000) listed 14 subspecies belong to *Mesobuthus eupeus* complex. Polymorphic *M. eupeus* is still under revision (Fet, 2010; Fomichev, 2011). Recently *M. e. philippovitschi* (Birula, 1905) was synonymized with *M. e. eupeus* (C.L. Koch, 1839), and *M. e. mesopotamicus* (Penther, 1912) was synonymized with *M. e. phillipsii* (Pocock, 1889) by Kovařík *et al.* (2011). After this study Mirshamsi *et al.* (2011) raised *M. e. phillipsii* to the species level. In the ventral carinae of metasomal segments II and III of *M. e. thersites*, the size of denticles increases posteriorly and the terminal granule is very large and spinoid, whereas in *M. e. afghanus* and *M. e. eupeus*,

the size of denticles increases posteriorly but the last denticle is not large and spinoid (Mirshamsi *et al.*, 2011).

In *M. e. thersites* (Fig. 2), anterior margin of carapace with very weak median concavity, chela more robust, dorsal carinae on metasoma segments I–IV weak. In *M. e. mongolicus*, anterior margin of carapace with a very weak median projection or it is approximately straight, chela less robust, and dorsal carinae on metasoma segments I–IV strongly developed (Sun & Sun, 2011).



Fig. 2. *M. e. thersites* (C.L. Koch, 1839) from Altyn Dala State Nature Reservat. Kostanay Province, Kazakhstan (Photo by T.M. Bragina).

Distribution of *Mesobuthus eupeus thersites* (C.L. Koch, 1839) in Central Kazakhstan: The map of the distribution of *M. e. thersites* in Kazakhstan (Fig. 1) shows both the literature data and the new localities in Kostanay Province.

The area where scorpions were collected (Fig. 3) belongs to the northern deserts on brown soils with a complex vegetation of *Anabasis salsa*, *Artemisia gracilescens*, *Artemisia pauciflora*, *Nanophyton erinaceum* and *Poa bulbosa*. Also it includes sites with *Anabasis aphylla*, *Artemisia pauciflora*, *Atriplex cana* communities on small solonetztes and solonchaks in combination with *Artemisia semiarida* and *Stipa sareptana* communities in highly solonetzous loamy soils, sandy desert sites and clay small hill without vegetation (Fig. 4). Near the river, there is complex vegetation (Fig. 3) with *A. gracilescens*, *A. pauciflora*, *Festuca valesiaca*, *N. erinaceum* and *P. bulbosa*.

New localities of M. e. thersites in Central Kazakhstan (Altyn Dala State Nature Reservat):

1. Kazakhstan, Kostanay Province, Zhangel'dy District, Altyn Dala State Nature Reservat, house in the old winter camp Altybai, 12.05.2013, 49°08.705'N, 64°16.488'E (leg. T.M. Bragina), 1 ♀. **2.** Kazakhstan, Kostanay Province, Amangeldy District, Altyn Dala State Nature Reservat, near Rachmet (old village, now destroyed) small clay hill near Uly-Zhylyanshik River (Fig. 3), plastic pitfall trap, 04.07.2013, 49°16.7375'N, 65°14.2782'E to 49°16.7431'N, 65°14.2985'E (leg. T.M. Bragina) 4 ♂♂. **3.** Kazakhstan, Kostanay Province, Amangeldy District, Altyn Dala State Nature Reservat, near Rachmet (old village, now destroyed), grassland near Uly-Zhylyanshik River (Fig. 4), plastic pitfall trap, 04.07.2013, 49°15.8883'N, 65°16.6067'E to 49°15.8783'N, 65°16.6780'E (leg. T.M. Bragina), 1 ♂. **4.** Kazakhstan, Kostanay Province, Amangeldy District, Altyn Dala State Nature Reservat, near Rachmet (old village, now destroyed), vegetation with *Anabasis salsa* near Uly-Zhylyanshik River, plastic pitfall trap, 04.07.2013, 49°16.7676'N, 65°14.2550'E to 49°16.7937'N, 65°14.3091'E (leg. T.M. Bragina) 4 ♀, 4 ♂, 1 juv.



Fig. 3. Small clay hill near Uly-Zhylanshik River, Kostanay Province, Amangeldy District, Altyn Dala State Nature Reservat. (Photo by T.M. Bragina).



Fig. 4. Complex vegetation near Uly-Zhylanshik River, Kostanay Province, Amangeldy District, Altyn Dala State Nature Reservat. (Photo by T.M. Bragina).

Discussion

M. e. thersites is found in Russia, Iran, Kazakhstan, Uzbekistan, Tajikistan, Turkmenistan, Kyrgyzstan, and China (Xinjiang) (Fet & Lowe, 2000; Mirshamsi *et al.*, 2011; Sun & Sun, 2011). The exact distribution range of *M. e. thersites* in Central Asia still is not exactly known, but the records of Gromov (2001), Fomichev (2011) and present data show that *M. e. thersites* has a very wide range in Kazakhstan.

Our data show the new points of presence *M. e. thersites* in Central Kazakhstan, which are among the northernmost in Asia. These points complement the localities listed by Gromov (2001). It is important that the species was found in a protected natural area that will contribute to its preservation.

All specimens (except one female) were collected by pitfall traps. This kind of traps is useful to determine seasonal surface activity of insects and arachnids that live on soil surface. All specimens were collected in mid-summer, on 04.07.2013, therefore obtaining any seasonal ecological results were not possible from these materials. For *M. e. thersites*, Fet (1980) for Repetek Reserve in Turkmenistan (East Garagum sand desert) indicated surface activity (pitfall traps) from the end of March. Recently, Koç & Yağmur (2007) studied surface activity of *M. gibbosus* in western Turkey. Their results showed that the surface activity of females begin earlier than males, but males are more active on surface, therefore number of males is higher than females. We obtained 9 males and 4 females from pitfall traps; this could support the results of Koç & Yağmur (2007) that *Mesobuthus* males, looking for females, are more active than females on surface, a common trend for desert scorpions.

Acknowledgments

The authors wish to thank Dr. E.A. Hachikov for facilitating the transfer of materials to determine subspecies, all persons who assisted in the field work, especially E.A. Bragin, and both Dr. Victor Fet and Dr. Rahşen Kaya for the corrections and suggestions on the manuscript.

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The fragmented peri-Saharan distribution of the subgenus *Pandinurus* Fet, 1997 with the description of a new species from Chad (Scorpiones, Scorpionidae, *Pandinus*)

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Abstract

Despite their large size, the scorpions of the genus *Pandinus* Thorell, 1876 are surprisingly not sufficiently recorded in the African countries. This is particular true for the species that inhabit the Sahel zone, which seem to be very rare. The peri-Saharan pattern of distribution of the subgenus *Pandinurus* Fet, 1997 is very fragmented and this reflects the presence of endemic species such as the recent discovered *Pandinus nistriae* Rossi, 2014 in the northern Djibouti, where this genus was never recorded. In the present study, an additional new species, *Pandinus* (*Pandinurus*) *vachoni*, is described from Chad to represent the most western species of the subgenus *Pandinurus* ever recorded.

Keywords: Scorpions, Scorpionidae, *Pandinus*, *Pandinurus*, new species, Chad.

Introduction

Pandinus Thorell, 1876 is a widespread genus with presently 31 species distributed from Senegal to Yemen (Rossi, 2014). It includes five subgenera (Vachon, 1974; Fet, 1997) and almost half of the species are belonging to the subgenus *Pandinurus* (Rossi, 2014). In the recent years, two well known species such as *Pandinus dictator* (Pocock, 1888) and *Pandinus gambiensis* Pocock, 1899, both included in the CITES list, appendix II (Lourenço & Cloudsley-Thompson, 1996) have been reported from countries where they were not known previously (Prendini, 2004; Rossi, 2014). Even more remarkable, the discoveries of new *Pandinus* species in countries where scorpions of this genus were never regarded as in the cases of *Pandinus ugandaensis* Kovařík, 2011 from Uganda, *Pandinus ulderigoi* Rossi, 2014 from Central African Republic, and *Pandinus nistriae* Rossi, 2014 from Djibouti. Several species of the subgenus *Pandinurus* have a

peri-Saharan distribution, starting in East-Africa with *P. nistriae* in the northern Djibouti, passing through Eritrea and northern Ethiopia with *P. magrettii* Borelli, 1901 and arriving into the Sahel zone in Sudan with *P. sudanicus* Hirst, 1911. A new species is now reported from Chad and it represents the most western species of the subgenus *Pandinurus*, although the exact locality of collecting remains, for the moment, unknown. However, a very important indication about its distribution could come from the presence of traces of the substratum. In fact, the specimen has many incrustations on the cuticula which confirm, for size, colour and aspect, a provenance from the Sahel that occupies the central zone of Chad (Bellani, 2008). Also for the recent described species, *P. ulderigoi* from Central African Republic, the exact type locality was unknown. However, new examined material allowed discovering the correct type locality (Rossi, in preparation). Also in that case, the analysis of the incrustations on the cuticula addressed to a possible habitat represented by tropical forest that was subsequently confirmed by the new examined specimens with precise and known localities.

Material and Methods

Descriptions and measurements (in mm) mostly follow respectively Hjelle (1990) and Sissom *et al.* (1990). The new species of the subgenus *Pandinurus* is compared with the other three species of the subgenus that show a peri-Saharan distribution: *Pandinus nistriae* Rossi, 2014 from Djibouti, *Pandinus magrettii* Borelli, 1901 from Eritrea and Ethiopia, and *Pandinus sudanicus* Hirst, 1911 from Sudan. An updated identification key for the subgenus *Pandinurus* is proposed.

Abbreviations used:

L = length; W = width; H = height.

BMNH = Natural History Museum, London, United Kingdom

MCVR = Museo Civico di Storia Naturale di Verona, Italy

MRAC = Musée Royal de l'Afrique Centrale, Tervuren, Belgium

MSNM = Museo Civico di Storia Naturale di Milano, Italy

MZUF = Museo di Storia naturale dell'Università degli Studi di Firenze, Sezione di Zoologia "La Specola", Italy

Taxonomy

Family Scorpionidae Latreille, 1802

Genus *Pandinus* Thorell, 1876

Subgenus *Pandinurus* Fet, 1997

Pandinus (Pandinurus) magrettii Borelli, 1901 (For the references see Rossi: 2014)

Type locality and type depository: Eritrea, Keren; MSNM.

Distribution: Eritrea, Ethiopia.

Material examined: 4♀♀, 2 imm., Eritrea, Adi Ugrì, 16-30.VI.1901, leg. A. Andreini, (MZUF: 1110); 1♀, Ethiopia, Mai Canetà, 1936, leg. Cartolari, (MCVR: 200).

Pandinus (Pandinurus) nistriae Rossi, 2014

Type locality and type depository: Djibouti, Medeho; MZUF.

Distribution: Djibouti.

Material examined: 1♂ holotype, Djibouti, Medeho, Obock district, 11°58'15"N, 43°01'30"E, 25.II.2013, leg. P. Agnelli, A. Nistri & A. Ugolini, (MZUF: 4133).

Pandinus (Pandinurus) sudanicus Hirst, 1911
Pandinus exitialis sudanicus Hirst, 1911: 219.
Pandinus magretti: Birula, 1928: 85 (in part).
Pandinus (Pandinurus) magretti (in part): Fet, 2000: 471–472; Kovařík, 2009: 54.
Pandinus sudanicus: Kovařík, 2012: 1, 3-4, 6, 12, 17, 19-20; Rossi, 2014: 11-12, 16, 21.
Type locality and type depository: Sudan, Gebel Mountains, S of Obeid; BMNH.
Distribution: Sudan.
Material examined: 1♀, Sudan, Ingessana hills, S. W. of Roseires, 11°27'N, 33°59'E, XII.1968, leg. J. L. Cloudsley-Thompson, (MRAC: 134.601).

Pandinus (Pandinurus) vachoni sp. n. (Figs. 1, 2)

Pandinus sp. Prendini *et al.* 2003: 234.

Type locality and type depository: Chad; MRAC.

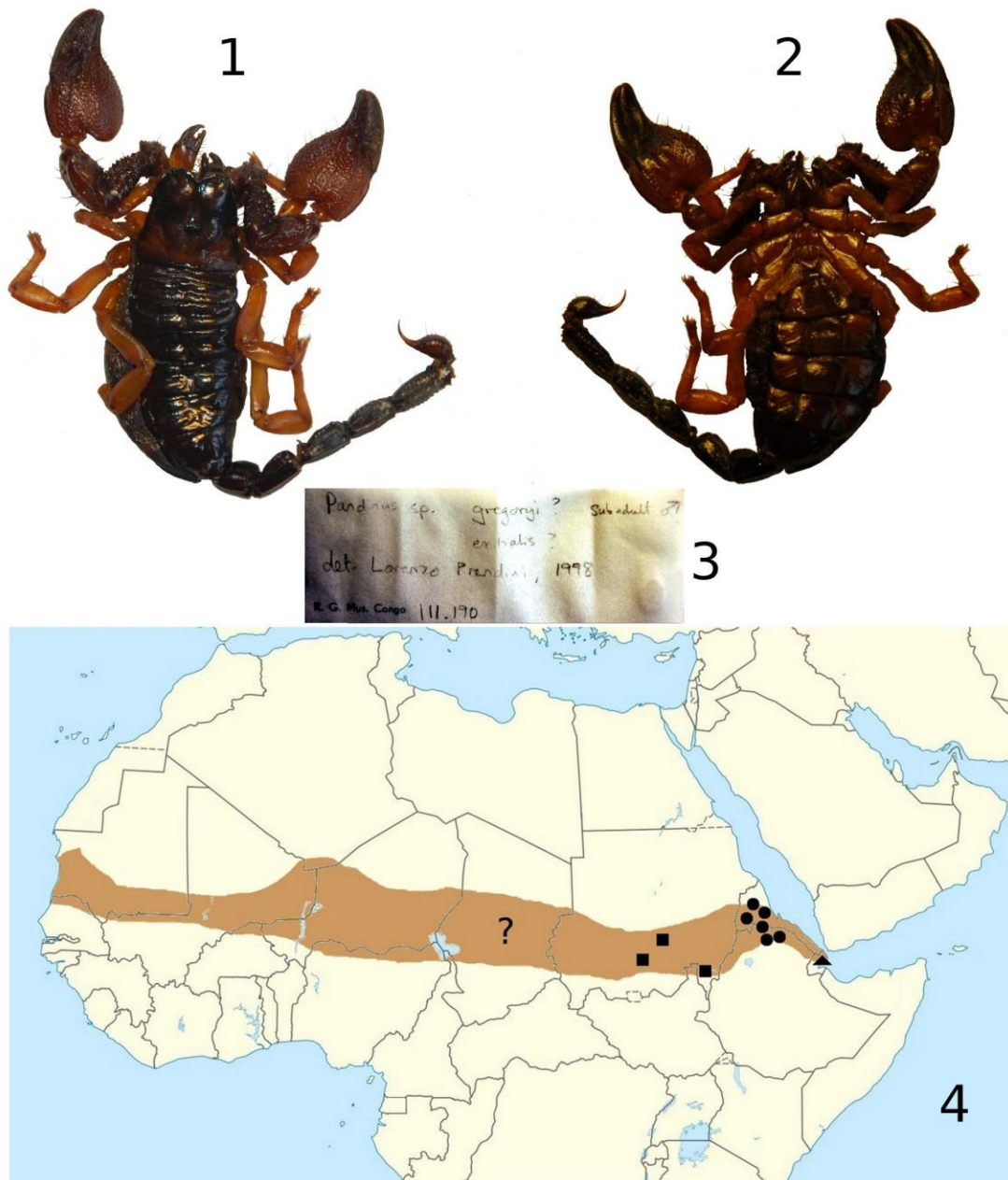
Type material: 1 subadult ♂ holotype, Chad, [without exact locality but most probably from the Sahel zone in the central area of Chad], leg. Bruining, (MRAC: 111.190).

Diagnosis: total length 72.73 mm (Table 1). Chela of pedipalp with 2 internal and 9-10 ventral trichobothria (Fig. 6). Base colour uniformly blackish-brown, legs yellowish-orange (Fig. 1). Pectinal teeth number 22-24 in male (Fig. 2). Dorsal surface of manus with many tubercles but not conical or pointed (Fig. 1). Dorsal carinae on third and fourth metasomal segments without marked denticles (Figs. 1, 2). Ventral side of manus with two longitudinal carinae covered by several small granules. Tarsomere II with 3 spines on the inclined antero-ventral surface. Spination formula of tarsomere II = 6/4: 6/4-5: 6-7/4: 7/4. Tarsomere I of legs IV has a distal prosuperior seta (Fig. 12).

Etymology: The species is named in honour of the late Prof. Max Vachon (1908-1991) for his important contribution to the taxonomy of the genus *Pandinus*.

Table 1. Morphometric values (in mm) of the subadult ♂ holotype of *Pandinus (Pandinurus) vachoni* sp. n.

<i>Pandinus (Pandinurus) vachoni</i> ♂, MRAC 111.190	
Carapace L/W	11.12/12.66
Mesosoma L	24.03
Metasomal segment I L/W/H	5.01/4.86/3.58
Metasomal segment II L/W/H	5.43/4.39/3.21
Metasomal segment III L/W/H	5.71/3.81/3.29
Metasomal segment IV L/W/H	5.84/3.39/2.98
Metasomal segment V L/W/H	8.12/3.30/3.22
Telson L/W/H	7.47/2.96/2.83
Pedipalp femur L/W	8.19/3.97
Pedipalp patella L/W	8.59/4.43
Pedipalp chela L/W	16.05/9.62
Pedipalp movable finger L	10.33
Pectinal teeth	24-22
Total L	72.73



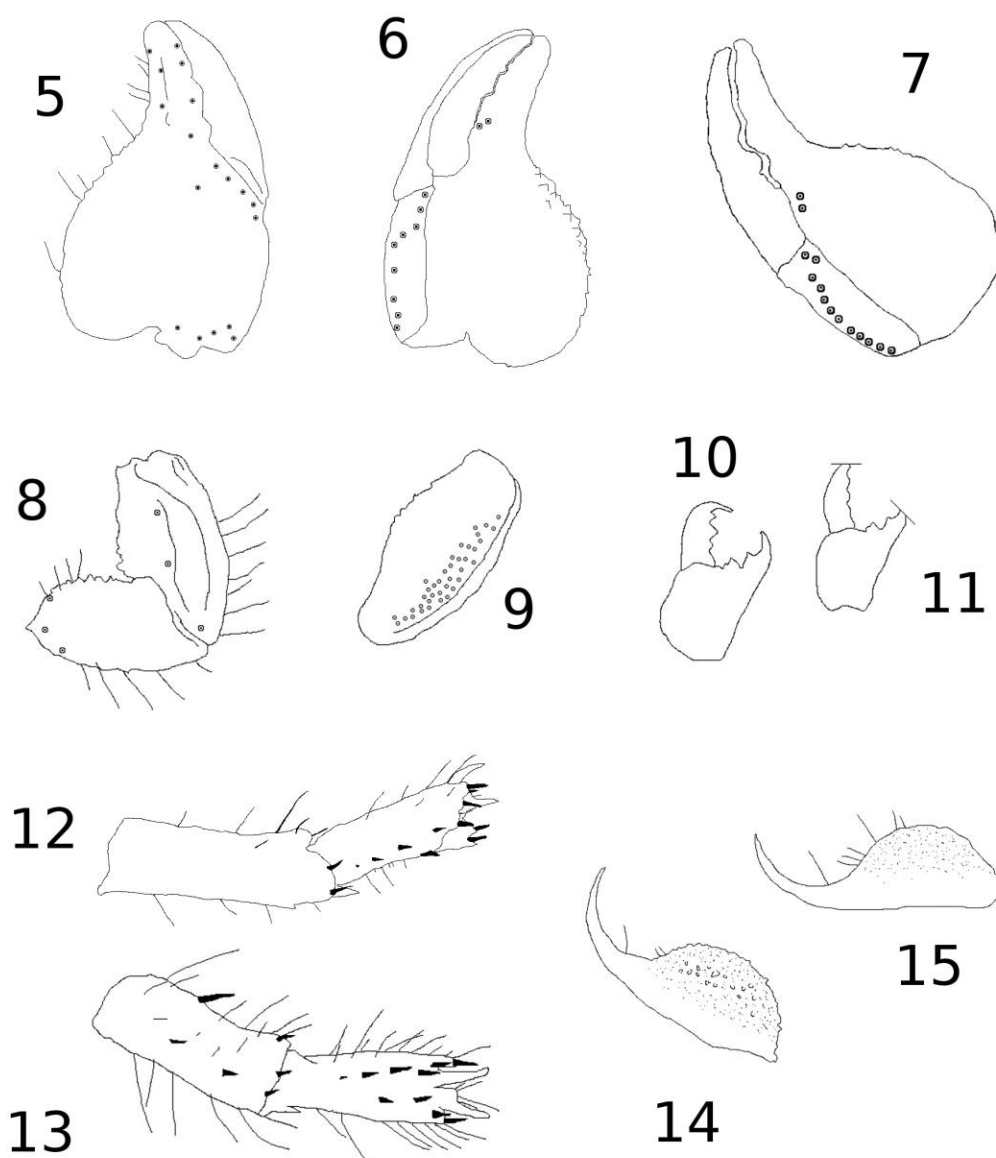
Figs. 1-2. *Pandinus (Pandinurus) vachoni* sp. n. male holotype. 1. dorsal view. 2. ventral view. Fig. 3. Original label in the vial. Fig. 4. Map of distribution of the species of the subgenus *Pandinurus* in the Sahel: triangle = *P. nistriae*; circle = *P. magrettii*; square = *P. sudanicus*; question mark = *P. vachoni* sp. n.; orange-brown area = approximate zone of the Sahel.

Description

Colouration: carapace dark brown; tergites uniformly blackish-brown; sternites dark brown; metasomal segments uniformly blackish-brown; pleural membrane dark grey to blackish; pedipalps brown but fingers blackish-brown; telson dark brown; pectines and genital operculum dark yellow; coxapofisis brown; legs and sternum yellowish-orange (Figs. 1-2).

Prosoma: carapace without carinae; two depressions in each posterior sides; the surface is smooth and scarcely granulated. Its posterior width is longer than its length. The anterior margin has a concavity. Median eyes orange-brown and separated by less than two ocular

diameters; three pairs of small lateral eyes black. The distance from the anterior border of the carapace to the median eyes is about 55% of the carapace length.



Figs. 5-9. Trichobothrial pattern. 5-6, 8-9. *P. vachoni* sp. n. male holotype. 5-6. Right pedipalp chela. 5. dorsal view. 6. ventral view. 8. Right femur and patella, dorsal view. 9. Right patella, ventral view. 7. Right pedipalp chela of *P. nistriae* Rossi, 2014 male holotype, ventral view. Figs. 10-11. Chelicera, dorsal view. 10. *P. magrettii* Borelli, 1901. 11. *P. vachoni* sp. n. male holotype. Figs. 12-13. Tarsomeres I and II of legs IV. 12. *P. vachoni* sp. n. male holotype 13. *P. magrettii*. Figs. 14-15. Telson. 14. *P. magrettii*. 15. *P. vachoni* sp. n. male holotype.

Mesosoma: tergites smooth without carinae. Sternites smooth; sternites III to VI with two furrows; sternite VII with two vestigial furrows. Spiracles strongly elongated.

Metasoma: elongated with all segments longer than wide; length/width ratio of I metasomal segment is 1.03 and that of V metasomal segment is 2.46; segment I with 8 complete and 2 incomplete lateral carinae; segments II to IV with 8 carinae; segment V

shows 7 carinae, which have spinoid tubercles. Segments I to IV are ventrally smooth while segment V is strongly granulated.

Telson: vesicle is relatively small and elongated with few hairs; it is finely granulated; aculeus curved and about as long as vesicle; subaculear tubercle not noticeable (Fig. 15).

Chelicerae: ventral aspect of both fingers and manus covered with long yellow dense setae. Movable finger with distal external and distal internal teeth not opposable to moderately opposable. The teeth of the movable finger are low and not pointed (Fig. 11).

Pedipalps: all segments are scarcely hirsute. Trochanter strongly granulated. Femur with four marked tuberculated carinae; many granules are present on anterior and dorsal side of femur; the externoventral carina is scarcely marked and distally smooth. The patella shows five carinae mainly smooth; the external surface of patella is smooth while the anterior surface is finely granulated. The chela is lobate (Fig. 5), with a L/W ratio of 1.67, and has two smooth ventral carinae. The entire dorsal surface of the chela is densely tuberculated: the granules are not pointed; their summits are sometimes confluent; the granules are arranged in three dorsal carinae which are confused with the other granules (Fig. 1). The movable finger does not show a big distal tooth. Both movable and fixed fingers have 5 or 6 subrows on the dentate margin. The internal surface of the chela has many granules and two carinae. Chela of pedipalp with 2 internal and 9-10 ventral trichobothria (Fig. 6). The trichobothrial pattern is Type C (Vachon, 1974) (Figs. 8, 9).

Legs: scarcely hirsute. Prolateral pedal spurs present. Tarsomere II of all legs bears three spines on the inclined anteroventral surface. The spination formula of tarsomere II = 6/4: 6/4-5: 6-7/4: 7/4. Tarsomere I of legs I-III bears a distal prosuperior spine. Tarsomere I of legs IV has a distal prosuperior seta (Fig. 12).

Pectines, genital operculum and sternum: pectinal teeth count is 22-24 in the male holotype; female unknown. Genital operculum wide and lobate, divided into two parts; it is strongly wider than long. Sternum subpentagonal, longer than wide (Fig. 2).

Distribution: Chad.

Relationships and comments: *Pandinus vachoni* sp. n. can be readily distinguished from the other three species of the subgenus *Pandinurus* with a peri-Saharan distribution by a combination of characters. *Pandinus nistriae* Rossi, 2014 has a very different spination formula of tarsomere II = 6-7/5: 7/5: 7/5-6: 8/6 and the pedipalp chela with 11-12 ventral trichobothria (Fig. 7). *Pandinus sudanicus* Hirst, 1911 has tarsomere II with only 2 spines on the inclined anteroventral surface and the pedipalp chela with 11-12 ventral trichobothria. *Pandinus magretti* Borelli, 1901 has a reduced number of pectinal teeth (18-22), the pedipalp chela with 10-11 ventral trichobothria, the chelicera movable finger with longer and more pointed teeth (Fig. 10), the tarsomere I of legs IV which bears a distal prosuperior spine (Fig. 13) and the vesicle strongly granulated (Fig. 14).

Biogeographical and ecological notes

Ecological data on *Pandinus* species are quite rare. Lourenço & Cloudsley-Thompson (1999) discussed the populations of *Pandinus imperator* (C.L. Koch, 1841) in the Ivory Coast. Subsequently Prendini (2004) gave some additional notes on the three species in the CITES list. Kovařík (2011, 2012, and 2013) showed new data for several species from East-Africa. However, little is known about the four *Pandinurus* species that inhabit the Sahel. The most common species seems to be *P. magretti* which is present in Eritrea and northern Ethiopia. A specimen from Mai Canetà, deposited in MCVR, represents a new locality in northern Ethiopia (Fig. 4). It was collected in 1936, most probably during the Italian expedition to Abyssinia that did stop-over in the same locality (Genta, 1937). A species with a relatively wide distribution is also *P. sudanicus* which is present in several localities in Sudan. Kovařík (2012) cited repeatedly that it is present in

South Sudan but actually no specimens are known from this country. It is recorded in the states of Northern Kordofan and Southern Kordofan. The specimen deposited in MRAC came from Ingessana and was collected personally by Prof. J.L. Cloudsley-Thompson. It represents a new record of this species from the state of Blue Nile, in Sudan (Fig. 4). Hirst (1911) cited a single male of *P. exitialis* (Pocock, 1888), deposited in BMNH, from Blue Nile (now Al Jazirah) but most probably it belongs to *P. sudanicus*. A very rare species is *P. nistriae*; it is recorded only in the northern Djibouti, from the locality of Medeho in the Obock district (Fig. 4). Finally, *P. vachoni* sp. n. comes from Chad, most probably from the central zone represented by the Sahel, in a zone of transition between the Sahara desert and the savannah (Bellani, 2008). The scorpion fauna of Chad was recently studied by Lourenço *et al.* (2012) with the descriptions of nine new species, showing that the scorpions in this country were still insufficiently studied. In fact, a very wide area between Chad and Libya is very little investigated concerning scorpion-fauna (Rossi *et al.*, 2013). However, Lourenço *et al.* (2012) did not record any *Pandinus* species in Chad. Prendini *et al.* (2003) cited a single specimen from Chad which is the same sample examined in this study. It was personally studied by Prendini in 1998, as proved by a label in its vial (Fig. 3). He tentatively assigned this specimen to “*P. exitialis*/*P. gregoryi*” with a question mark. This decision was anyway incorrect since both *P. exitialis* and *P. gregoryi* (Pocock, 1896) have the tarsomere II with 2 spines on the inclined anteroventral surface, while *P. vachoni* sp. n. has 3 spines.

Identification key for the species of the subgenus *Pandinurus* Fet, 1997:

1. Tarsomere II with 3 spines on the inclined anteroventral surface 2
- . Tarsomere II with 2 spines on the inclined anteroventral surface 8
2. Spination formula of tarsomere II of 4th leg = 8-9/6. Chela of pedipalp bears 11-14 ventral trichobothria 3
- . Spination formula of tarsomere II of 4th leg = 6-8/4-5. Chela of pedipalp bears 9-12 ventral trichobothria 4
3. 12-14 ventral trichobothria; typical spination formula of tarsomere II = 7-8/5-6: 8/6: 8/6: 8-9/6-7; in male L/H ratio of IV metasomal segment 2.63; dorsal surface of chela almost smooth *P. meidensis* Karsch, 1879
- . 11-12 ventral trichobothria; spination formula of tarsomere II = 6-7/5: 7/5: 7/5-6: 8/6; in male L/H ratio of IV metasomal segment 2.37; dorsal surface of chela densely granulated *P. nistriae* Rossi, 2014
4. Dorsal surface of manus with evenly sized conspicuous granules. Chela densely hirsute. Chela of pedipalp length to width ratio in both sexes between 2 and 2.2 5
- . Dorsal surface of manus more or less tuberculate, without evenly sized granules. Chela with only a few hairs, more lobate and wider. Chela of pedipalp length to width ratio in both sexes between 1.6 and 1.9 6
5. Legs of adults yellow. Tarsomere I of legs I- IV with distal prosuperior spine. Females with 20-23 pectinal teeth *P. somalilandus* Kovařík, 2012
- . Legs of adults reddish brown. Tarsomere I of legs I-III with spine, but on leg IV with distal prosuperior seta. Female with 18 pectinal teeth *P. awashensis* Kovařík, 2012
6. Distribution: Asia (Yemen) *P. arabicus* (Kraepelin, 1894)
- . Distribution: Africa (Eritrea, Ethiopia, Chad) 7
7. Pectinal teeth number 18-22; 10-11 ventral trichobothria; tarsomere I of legs IV bears a distal prosuperior spine *P. magretti* Borelli, 1901

- . Pectinal teeth number 22-24; 9-10 ventral trichobothria; tarsomere I of legs IV bears a distal prosuperior seta *P. vachoni* sp. n.
8. Chela of pedipalp bears 10-14 ventral trichobothria. Male has more pronounced tooth on movable finger of pedipalp 9
- . Chela of pedipalp bears 6-11 ventral trichobothria. Movable finger of pedipalp without noticeable sexual dimorphism 11
9. Dorsal surface of manus with evenly sized conspicuous granules. Chela densely hirsute *P. exitialis* (Pocock, 1888)
- . Dorsal surface of manus more or less tuberculate, often with longitudinal carinae but without conical, evenly sized granules. Chela hirsute, but not densely 10
10. Legs reddish brown. Distribution: Kenya *P. gregoryi* (Pocock, 1896)
- . Legs yellow to yellowish, always lighter-coloured than body. Distribution: Sudan *P. sudanicus* Hirst, 1911
11. Legs yellow to yellowish, always lighter-coloured than body *P. pallidus* (Kraepelin, 1894)
- . Legs brownish and coloured as body 12
12. Males with chela, femur and patella of pedipalp narrower and longer than in females. Distribution: Africa 13
- . Length of segments of pedipalp without noticeable sexual dimorphism. Distribution: Asia (Yemen) *P. percivali* Pocock, 1902
13. Dorsal surface of chela reddish black and entirely granulated. Spination formula of tarsomere II of 4th leg = 4/3. First metasomal segment is wider than long in males. Chela of pedipalp length to width ratio in males less than 2.2 *P. lowei* Kovařík, 2012
- . Dorsal surface of chela red and smooth, with granules in anterior part only. Spination formula of tarsomere II of 4th leg = 5/3. First metasomal segment longer than wide in males. Chela of pedipalp length to width ratio in males greater than 2.5 *P. viatoris* (Pocock, 1890)

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The first record of family Segestriidae Simon, 1893 (Araneae: Dysderoidea) from Iran

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Abstract

The family Segestriidae Simon, 1893 and the species *Segestria senoculata* (Linnaeus, 1758) are recorded in Iran for the first time, based on a single female specimen.

Keywords: Spiders, Segestriidae, *Segestria senoculata*, new record, Iran.

Introduction

Segestriidae Simon, 1893 is a small family of medium-sized, araneomorph, ecribellate, haplogyne spiders with three tarsal claws which are globally represented by 119 species in three genera (Platnick, 2014). These spiders are six-eyed, and are usually distinguishable by having their third pair of legs directed forwards. From taxonomic point of view, Segestriidae is closely related to Dysderidae, and are considered as a member of the superfamily Dysderoidea. The type genus, *Segestria* Latreille, 1804, is consisted of 18 species and one subspecies which are mostly distributed in the Palaearctic ecozone (Platnick, 2014). One of the more distributed species is *Segestria senoculata* (Linnaeus, 1758). This species, like most segestriids, occupies a wide variety of habitats; they prefer living in holes within walls and barks, or under stones, where they build a tubular retreat, with strong threads of silk radiating from the entrance (Roberts, 1995).

So far, about 500 spider species of more than 38 families have been reported from Iran (based on our upcoming work on the renewed checklist and the history of studies), but no documentation of the family Segestriidae has been reported from Iran (Mozaffarian & Marusik, 2001; Ghavami, 2006; Kashefi *et al.*, 2013).

Material and Methods

One female specimen was collected by hand from under the bark of a fallen tree. The vulvae were removed and immersed in cold KOH for 24hrs, and later examined using a Nikon SMZ-1000 stereo microscope. The specimen is deposited in Jalal Afshar Zoological Museum of University of Tehran (JAZM, curator Dr. Alireza Sabouri).

Taxonomy

Family Segestriidae Simon, 1893

Genus *Segestria* Latreille, 1804

Diagnosis: members of this genus can be diagnosed from those of *Ariadna* Audouin, 1826 and *Gippsicola* Hogg, 1900 by a number of characters: three anterior and two posterior cheliceral teeth; long, narrow, and nearly parallel-sided labium; numerous spines on leg IV and tibiae and metatarsi I and II of females with two ventral rows of spines (Giroti & Brescovit, 2011).

Segestria senoculata (Linnaeus, 1758) (Figs. 1-5)

Aranea senoculata Linnaeus, 1758: 622.

For detailed list of synonymies, see Platnick (2014).

Material examined: 1♀ (JAZM), Iran: *Mazandaran Province*: Sari County, 36°27'N, 53°04'E, March 2014, leg. Zamani (Fig. 1).



Fig. 1. The collecting site of *Segestria senoculata* (Linnaeus, 1758) in Iran.

Description: Female (Figs. 2-5). Total length 6.6 mm. Prosoma, 3.2 mm long, brownish black, darker in the cephalic region. Chelicerae blackish and long, with teeth on anterior and posterior margins. Sternum and legs light brown. Metatarsus I with three pairs of ventrolateral spines. Opisthosoma, 3.4 mm long, with grey margins and dark brown dorsal lobed pattern in the midline, ventrally without any pattern.

Diagnosis: This species can be diagnosed from its closely related species by the presence of three pairs of ventrolateral spines on metatarsus I (Fig. 5) (Roberts, 1995), their abdominal patterns and the elongation of the bulbal tip in male palps.

Global distribution: Palearctic (Platnick, 2014).



Figs. 2-5. *Segestria senoculata* (Linnaeus, 1758), female. 2. Habitus, dorsal view. 3. Ditto, ventral view. 4. Eyes. 5. Metatarsus I, ventrolateral spines.

Discussion

Considering the wide distribution of this species in the Palaearctic, its presence in Iran is not surprising. Actually, two other species which might also be found in Iran are *Segestria florentina* (Rossi, 1790) (Europe to Georgia, and South America) and *S. bavarica* C.L. Koch, 1843 (Europe to Azerbaijan) (Platnick, 2014).

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A new record for the araneofauna of Turkey (Araneae: Salticidae)

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Abstract

The salticid spider species, *Pellenes epularis* (O.P.-Cambridge, 1872) is recorded for the first time from Turkey. Its morphology is briefly discussed. Diagnostic description and pictures of general habitus and male palpal organ are presented.

Keywords: Spiders, Araneae, Salticidae, *Pellenes epularis*, new record, Turkey.

Introduction

The Salticidae Blackwall, 1841 is the largest family of spiders with 5678 described species (Platnick, 2014). A total of 106 species in 40 genera of Salticidae are known in Turkey (Bayram *et. al.*, 2014). In this study, a new species recorded for the first time for the araneofauna of Turkey.

There are 4 species of genus *Pellenes* Simon, 1876 recorded from Turkey until now. They are: *Pellenes diagonalis* (Simon, 1868), *P. flavipalpis* (Lucas, 1853), *P. geniculatus* (Simon, 1868) and *P. nigrociliatus* (Simon, 1875) (Bayram *et al.*, 2014). In this study, *Pellenes epularis* (O.P.-Cambridge, 1872), which is known from Greece to China, Namibia, and South Africa (Platnick, 2014), is reported for the first time from Turkey. Therefore, the known species of genus *Pellenes* is raised to five in Turkey.

Material and Methods

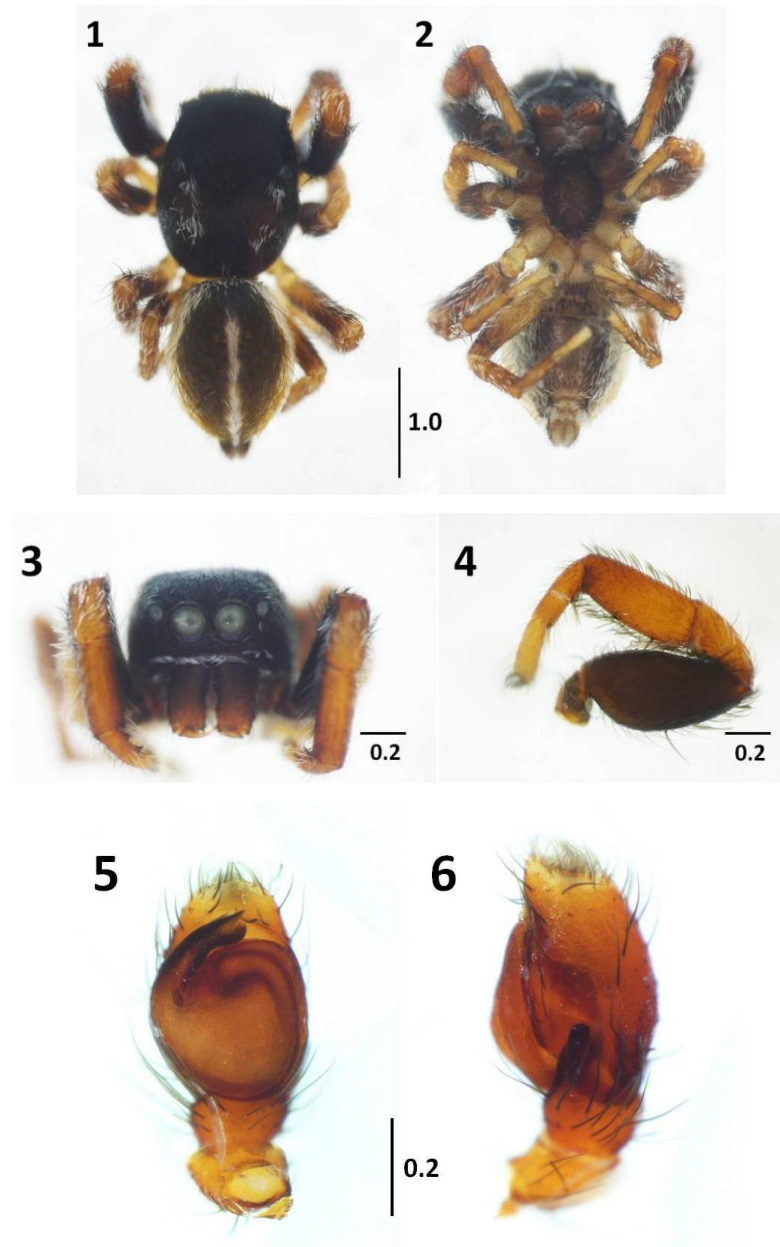
This study is based on the material collected from different region of Muş Plain of Muş Province in the Eastern Anatolia. Specimens were collected by means of hand aspirator under stones and on plants. Chiefly well known identification keys were used for identification (Metzner, 1999; Prószyński, 2003). The identification was made by Lieca S8APO stereo microscope. Pictures were taken, using a Leica S8APO microscope, by means of a Leica DC 160 camera. Specimens were preserved in 70% ethanol.

Abbreviations used: Fe: Femur, Pa: Patella, Ti: Tibia, Mt: Metatarsus, Ta: Tarsus. All measurements are in millimetres. The specimens are deposited in the Central Laboratory of Muş Alparslan University.

Results

Pellenes epularis (O.P.-Cambridge, 1872) Figs. 1-6.

Material examined: 3♂♂, Muş Province, Hasköy District, Elmabulak Village, (38°39'02.1"N 41°40'24.9"E) on the ground in a field; Hasköy District, (38°41'08.8"N 41°42'18.6"E); Hasköy District, near Düzkişla Town (38°42'27.6"N 41°43'06.0"E) (Fig. 7).



Figs. 1-6. *Pellenes epularis* (O.P.-Cambridge, 1872), male. 1-2. Habitus. 1. Dorsal view. 2. Ventral view. 3. Eyes, frontal view. 4. Leg I, lateral view. 5-6. Palpal organ. 5. Ventral view. 6. Retrolateral view.

Description ♂ (Figs. 1-4): Prosoma is covered by black hairs with patches of white hairs on both sides. There are a few white hairs behind the posterior lateral eyes. Frontal eyes are surrounded by a few yellow hairs. Clypeus is dark with a line of white hairs. Chelicerae are brown with dark hairs. Legs are covered by white and black hairs. Femur I is stout and dark coloured. Opisthosoma is black and intensely covered with yellow hairs, dense on lateral sides. It has a median longitudinal band of white hairs. Male palpal organ (Figs. 5-6).

Measurements: Total length: 3.0; Prosoma length 1.55, width 1.20; Opisthosoma length 1.45, width 1.05. Leg formula: III-I-IV-II. Lengths of legs:

I. Fe: 0.80, Pa: 0.20, Ti: 0.55, Mt: 0.40, Ta: 0.30, Total: 2.25.

II. Fe: 0.60, Pa: 0.30, Ti: 0.35, Mt: 0.27, Ta: 0.25, Total: 1.77.

III. Fe: 1.00, Pa: 0.50, Ti: 0.52, Mt: 0.40, Ta: 0.35, Total: 2.77.

IV. Fe: 0.75, Pa: 0.35, Ti: 0.40, Mt: 0.37, Ta: 0.35, Total: 2.22.



Fig. 7. The habitat where *Pellenes epularis* was collected (Hasköy District).

Comment

In addition to the new record of a salticid species from Turkey, this study confirms the zoogeographic importance of the Anatolian Peninsula as a link between Europe and Asia.

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Preliminary list of spiders and other arachnids of Saudi Arabia (Except ticks and mites)

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Abstract

Seven orders of class Arachnida were recorded from Saudi Arabia; in addition to Acari (ticks and mites are outside the scope of this work). They are: Araneae (25 Families, 69 genera, 77 species), Scorpiones (3 Families, 14 genera, 23 species), Pseudoscorpiones (5 Families, 11 genera, 19 species), Solifugae (4 Families, 8 genera, 15 species), Opiliones (1 Family, 1 genus, 1 species), Palpigradi (1 Family, 1 genus, 1 species), and Amblypygi (1 Family, 1 genus, 1 species). The total is: 40 Families, 105 genera, 137 species. Each order section includes recorded taxa with their localities, list of species, and keys to families of spiders, scorpions, pseudoscorpions, and sun-spiders.

Four spider families (Araneidae, Corinnidae, Oonopidae, Palpimanidae), 7 genera [*Arctosa* ? (Lycosidae), *Micaria* (Gnaphosidae), *Oecobius* (Oecobiidae), *Oxyopes* (Oxyopidae), *Runcinia* (Thomisidae), *Thanatus* & *Tibellus* (Philodromidae)], and 2 species [*Tibellus vossioni* Simon, 1884 (Philodromidae) and *Runcinia grammica* (C.L Koch, 1837) (Thomisidae)] are recorded from Saudi Arabia for the first time.

Notes on four species, *Runcinia grammica* (Thomisidae), *Tibellus vossioni* (Philodromidae), *Pterotricha dalmasi* (Gnaphosidae), and *Eusparassus laevatus* (Sparassidae), are included with pictures of habitus, palpal organ and epigynum of these species.

Keywords: Arachnida, Araneae, Scorpiones, Pseudoscorpiones, Solifugae, Opiliones, Palpigradi, Amblypygi, Saudi Arabia.

Introduction

Saudi Arabia (2,149,690 km²) is the largest Arab state in Asia. It is called the "Land of the Two Holy Mosques" in Mecca and Medina, the two holiest places in Islam. Saudi Arabia is divided into 13 provinces (Fig. 1). Most of the country is desert.

Although, it has the world's second largest oil reserve, its natural resources, especially invertebrate animals, are poorly studied. The studies on spiders and other

arachnids are few. The available publications dealt with collected arachnid specimens were consulted to prepare this preliminary list of Saudi Arabian spiders and other arachnids. Also, arachnid specimens collected from different regions of Saudi Arabia by colleagues were primarily identified, sometimes only to genus or family levels because of lack of information or because the specimens are not adult. More specimens and better identification are required to get better information on the arachnids of the country. Seven orders of class Arachnida are recorded from Saudi Arabia; in addition to Acari (ticks and mites are outside the scope of this work). Orders Schizomida, Uropygi, and Ricinulei are not recorded yet from Saudi Arabia.

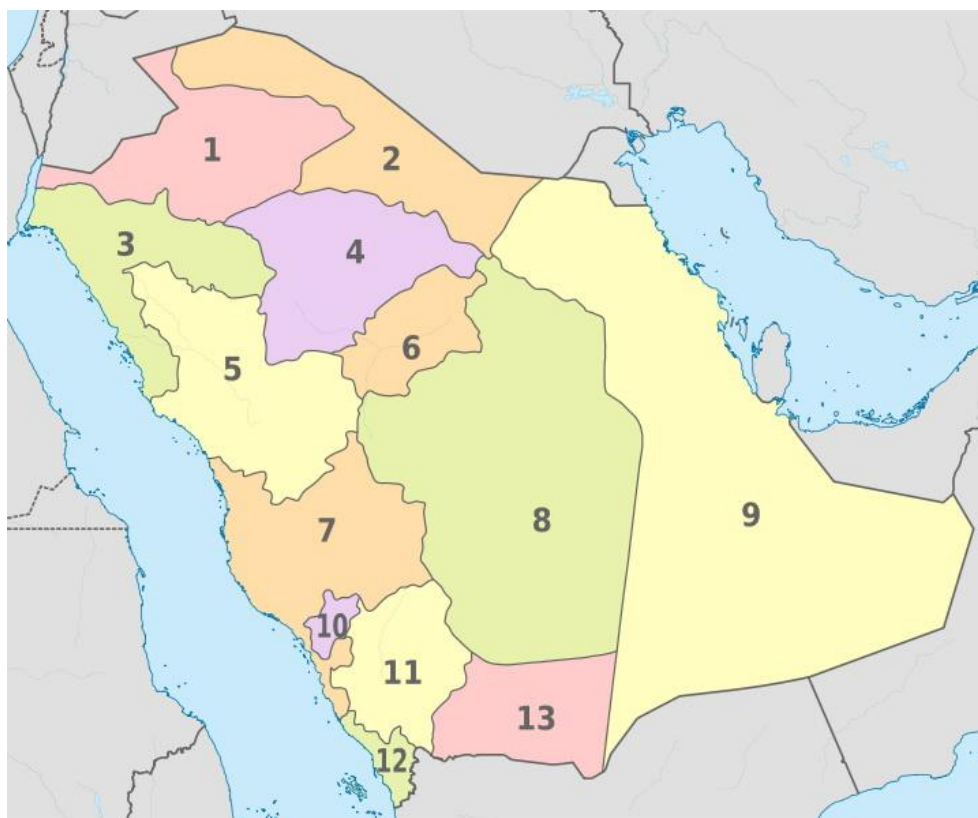


Fig. 1. Map of Saudi Arabia and its provinces.

1. Al Jawf. 2. Northern borders. 3. Tabuk. 4. Ha'il. 5. Al Madinah. 6. Al Qasim. 7. Makkah. 8. Al Riyadh. 9. Eastern province. 10. Al Baha. 11. Asir. 12. Jizan. 13. Najran.

After Wikipedia (http://en.wikipedia.org/wiki/File:Saudi_Arabia_administrative_divisions_-_Nmbrs_-_colored.svg)

The seven recorded arachnid orders are: Araneae, Scorpiones, Pseudoscorpiones, Solifugae, Opiliones, Palpigradi, and Amblypygi. The numbers of recorded taxa are as follows:

Order	Families	Genera	Species
Araneae	25	69	77
Scorpiones	3	14	23
Pseudoscorpiones	5	11	19
Solifugae	4	8	15
Opiliones	1	1	1
Palpigradi	1	1	1
Amblypygi	1	1	1
Total	40	105	137

Each order is dealt with in a separate section that includes recorded taxa with their localities, list of species, keys to families of spiders, scorpions, pseudoscorpions, and sun-spiders. All the references are collected together. The authorship and date of publication of both Savigny and Audouin (1825) are according to El-Hennawy (2000).

The abbreviations used for collections mentioned in the text are:

AMNH = American Museum of Natural History, New York, USA

CTh = Coll. Konrad Thaler & Barbara Knoflach, Innsbruck, Austria

DBUJ = Department of Biosciences, University, Jeddah, Saudi Arabia

KSMA = King Saud University Museum of Arthropods, Al Riyadh, Saudi Arabia

MHNG = Muséum d'Histoire Naturelle, Genève, Switzerland

MNHNP, MNHN = Muséum National d'Histoire Naturelle, Paris, France

MRAC = Musée Royal de l'Afrique Centrale, Tervuren, Belgium

NHMB, NMB = Naturhistorisches Museum, Basel, Switzerland

PCMA = Private Collection Mark Alderweireldt

SMF = Senckenberg Research Institute, Frankfurt am Main, Germany

I. Spiders of Saudi Arabia

Among the sporadic publications on spiders of Saudi Arabia, a few families were "better" studied and a few publications are remarkable. These studies are reviewed below:

Jocqué (1981) described the new subspecies *Erigone vagans arabica* of Family Linyphiidae from Saudi Arabia. Later, he described three new zodariid species with Ono (Ono & Jocqué, 1986): *Trygetus riadhensis* and *Acanthinozodium buettikeri* from Riyadh's region, and alone (Jocqué, 1991): *Lachesana insensibilis* near Jeddah. Two of the three species are endemic.

Dippenaar-Schoeman (1989) recorded 8 species of crab spiders (Thomisidae) from Saudi Arabia, including a new endemic species called *Misumena buettikeri*, which is later transferred to genus *Ansiea*. Dippenaar-Schoeman & van Harten (2007) recorded the thomisid *Thomisus arabicus* Simon, 1882 and *Thomisus daradioides* Simon, 1890 from Saudi Arabia.

Prószyński (1989) described 19 species of Salticidae from Saudi Arabia, containing one new genus *Heliophanillus* and 10 new species, and stated that "the fauna exhibits a clear relationship with that of the Ethiopian region, with less influence from the Oriental one, and even less from the Mediterranean". Later, in his second part on "Salticidae of Saudi Arabia", Prószyński (1993) listed 12 species from Saudi Arabia, containing 6 new species.

Alderweireldt (1991) recorded *Evippa praelongipes* (O.P.-Cambridge, 1870) from Saudi Arabia and later (Alderweireldt, 1996) he described the new species *Ocyale neatalanta* which is now synonymised with *Ocyale pilosa* (Roewer, 1960). Alderweireldt & Jocqué (2005) described the new species *Hippasa sinai* from Sinai (Egypt) and Saudi Arabia.

Ovtsharenko *et al.* (1994) described the new endemic gnaphosid species *Synaphosus khashm* from Khashm Khafs, Ar Riyad, Saudi Arabia and recorded the presence of *Synaphosus syntheticus* in the country.

Jäger (2000) described the new endemic sparassid species *Cebrennus intermedius* from Saudi Arabia, and recorded *Cebrennus aethiopicus* Simon, 1880 from the country.

Knoflach & van Harten (2002) recorded 3 species of genus *Latrodectus* (Theridiidae) from Saudi Arabia; *Latrodectus dahli* Levi, 1959, *L. geometricus* C.L. Koch, 1841, and *L. renivulvatus* Dahl, 1902. In two "Notes on Mediterranean Theridiidae", the authors recorded both *Paidiscura dromedaria* (Simon, 1880) and

Theridion spinirtase O.P.-Cambridge, 1876 from Saudi Arabia (Knoflach & Thaler, 2000; Knoflach *et al.*, 2009).

El-Hennawy (2011) recorded the afrotropical *Cheiracanthium molle* L. Koch, 1875 from Al-Baha in Saudi Arabia for the first time.

Desouky & El-Hennawy (2012) presented a preliminary list of Ha'il's spiders, including 14 genera, in addition to five unidentified spider species, belonging to 16 families.

Moradmand (2013) described the new species *Eusparassus arabicus* from "Mintaqat ar Riyad" and other places of Saudi Arabia, and recorded *Eusparassus laevatus* (Simon, 1897) comb. nov. from Al Bahah and other regions of Saudi Arabia.

Abd El-Wakeil *et al.* (2014) studied the soil macroinvertebrates of Wadi Al-Arj in the Taif region of western Saudi Arabia and listed in Table (2) 10 families, 16 genera, and 8 species of spiders, in addition to the sun-spider *Biton* sp. of Family Daesiidae and the pseudoscorpion Family Olpiidae.

The specimens collected by El-Hawagry from Al-Baha region are partly studied. The final identification would add more records to the Saudi Arabian fauna.

This paper is the fourth one in the author's study of Saudi Arabian spiders. The first one recorded *Cheiracanthium molle*, its genus and its family from Saudi Arabia for the first time (El-Hennawy, 2011).

The second one (Desouky & El-Hennawy, 2012) recorded for the first time from Saudi Arabia 7 families, 8 genera, and 7 species of Order Araneae as follows:

Family **Agelenidae**, Genus *Benoitia*, *Benoitia lepida*

Family **Eresidae**, Genus *Stegodyphus*, *Stegodyphus lineatus*

Family **Oecobiidae**, Genus *Uroctea* sp.

Family **Pholcidae**, Genus *Artema*, *Artema atlanta*

Family **Scytodidae**, *Scytodes* sp.

Family **Selenopidae**, Genus *Selenops* sp.

Family **Sicariidae**, Genus *Loxosceles*, *Loxosceles rufescens*

Pterotricha dalmasi [Family **Gnaphosidae**]

Genus *Cerbalus* [Family **Sparassidae**]

Eusparassus walckenaeri [Family **Sparassidae**]

Latrodectus tredecimguttatus [Family **Theridiidae**]

The third one (Abd El-Wakeil *et al.*, 2014; identification of El-Hennawy) added 1 family, 9 genera, and 6 species to the spider fauna of Saudi Arabia as follows:

Family **Uloboridae**, Genus *Uloborus* sp.

Scytodes univittata [Family **Scytodidae**]

Genus *Poecilochroa*, *Poecilochroa senilis* [Family **Gnaphosidae**]

Genus *Trachyzelotes*, *Trachyzelotes jaxartensis* [Family **Gnaphosidae**]

Genus *Mermessus* [Family **Linyphiidae**]

Genus *Hogna*, *Hogna ferox* [Family **Lycosidae**]

Genus *Pardosa* [Family **Lycosidae**]

Genus *Wadicosa*, *Wadicosa fidelis* [Family **Lycosidae**]

Genus *Philodromus* [Family **Philodromidae**]

Genus *Steatoda*, *Steatoda paykulliana* [Family **Theridiidae**]

Now, this work records the following taxa from Saudi Arabia for the first time:

Families **Araneidae**, **Corinnidae**, **Palpimanidae** from Al-Baha and Family **Oonopidae** from Fawasan.

Genera *Arctosa* ? (Lycosidae), *Micaria* (Gnaphosidae), *Oxyopes* (Oxyopidae), *Runcinia* (Thomisidae), *Thanatus* & *Tibellus* (Philodromidae) from Al-Baha and genus *Oecobius* (Oecobiidae) from Abha.

Tibellus vossioni Simon, 1884 (Philodromidae) and *Runcinia grammica* (C.L Koch, 1837) (Thomisidae) from Al-Baha.

[The total is: 13 Families, 25 genera, and 16 species of Order Araneae.]

Order Araneae Clerck, 1757

Family **Agelenidae** C.L. Koch, 1837

Genus *Benoitia* Lehtinen, 1967

♂♀ *Benoitia lepida* (O.P.-Cambridge, 1876)

Benoitia lepida (O.P.-Cambridge, 1876) - Desouky & El-Hennawy (2012): 7♀, 1s♂, 3j, Ha'il City, 22 July 2010, N 27°32'35" E 41°42'15"; Rujama Village, 13 August 2011, N 27°55'09" E 42°08'25"; Sofaitt, 14 August 2011, N 25°37'50" E 40°38'10".

Benoitia lepida - Abd El-Wakeil *et al.* (2014): Wadi Al-Arj, Taif, Saudi Arabia.

Agelena sp.? - Al-Baha, leg. El-Hawagry: 1s♀, 25.5.2011, Gebel El-Baher.

Family **Araneidae** Clerck, 1757

Al-Baha, leg. El-Hawagry: 1j, 1.6.2011, Gebel El-Baher; 1j *Larinia* ? sp., 18.4.2012, 1j, 22.2.2012, Al-Mekhwa.

Family **Corinnidae** Karsch, 1880

Al-Baha, leg. El-Hawagry: 1j, 2.1.2012, Dhee Ain.

Family **Eresidae** C.L. Koch, 1845

Genus *Stegodyphus* Simon, 1873

♂♀ *Stegodyphus lineatus* (Latreille, 1817)

Stegodyphus lineatus (Latreille, 1817) - Desouky & El-Hennawy (2012): 5♀, Great Nofod, 21 August 2010, N 27°49'05" E 40°54'00"; Om Sanman, 21 August 2010, N 28°05'18" E 40°54'00"; Rujama Village, 13 August 2011, N 27°56'59" E 42°08'25".

Family **Gnaphosidae** Pocock, 1898

Genus *Micaria* Westring, 1851

Micaria sp. - Al-Baha, leg. El-Hawagry: 1j, 2.1.2012, Dhee Ain.

Genus *Poecilochroa* Westring, 1874

♂♀ *Poecilochroa senilis* (O.P.-Cambridge, 1872)

Poecilochroa senilis - Abd El-Wakeil *et al.* (2014): Wadi Al-Arj, Taif, Saudi Arabia.

Genus *Pterotricha* Kulczyński, 1903

♂♀ *Pterotricha dalmasi* Fage, 1929 (Figs. 1-6)

Pterotricha dalmasi Fage, 1929 - Desouky & El-Hennawy (2012): 1♂, 2♀, 1s♂, Rujama, 13 August 2011, N 27°56'10" E 42°07'45".

Pterotricha dalmasi - Al-Baha, leg. El-Hawagry: 2♀, 1.2.2012, 6♀, 1j, 11.4.2012, 1 s♂, 8.6.2011, 1j, 21.12.2011, Ghabet Shohba; 1♂, 4.4.2012, 2♀, 1j, 17.5.2012, Rhaghdan.

♂♀ *Pterotricha lesserti* Dalmas, 1921

Pterotricha lesserti Dalmas, 1921 - Levy, 1995: 960-962, f. 63, 98-102 (♂, S♀), *Pterotricha fanatica* Dalmas, 1921: 261, fig. 27; ♀ Syntype from Arabia, Jiddah (MNHN, B.663. Ar.3201).

Genus *Setaphis* Simon, 1893

♂♀ *Setaphis subtilis* (Simon, 1897)

Setaphis subtilis (Simon, 1897) - Platnick & Murphy, 1996: 9-12, f. 21-24, Material Examined: Saudi Arabia: Riyadh, Jan. 11, 1980 (A.S. Talhouk, NMB), 1♀.

Setaphis sp. - Abd El-Wakeil *et al.* (2014): Wadi Al-Arj, Taif, Saudi Arabia.

Genus *Synaphosus* Platnick & Shadab, 1980

♀ *Synaphosus khashm* Ovtsharenko, Levy & Platnick, 1994 **Only in Saudi Arabia**

Synaphosus khashm n.sp. - Ovtsharenko, Levy & Platnick, 1994: 24, f. 84-85 (D♀), Type: Female holotype from Khashm Khafs, Ar Riyad, Saudi Arabia (March 13, 1981: W. Büttiker), deposited in NMB.

♂♀ *Synaphosus syntheticus* (Chamberlin, 1924)

Synaphosus syntheticus - Ovtsharenko, Levy & Platnick, 1994: 5-6, f. 1-2, 12-20 (♂♀), Saudi Arabia: Dirab Pigeon, Dec. 2, 1979 (W. Büttiker, NMB), 1♂, 1♀.

Genus *Trachyzelotes* Lohmander, 1944

♂♀ *Trachyzelotes jaxartensis* (Kroneberg, 1875)

Trachyzelotes jaxartensis - Abd El-Wakeil *et al.* (2014): Wadi Al-Arj, Taif, Saudi Arabia.

Genus *Zelotes* Gistel, 1848

♂♀ *Zelotes laetus* (O.P.-Cambridge, 1872)

Zelotes laetus (O.P.-Cambridge, 1872) - FitzPatrick, 2007: 108, f. 21-24 (♂♀, S), Material examined: Saudi Arabia: Juriad Island [27°11'N, 49°57'E], 10 September 1981, J. M. Bafort, 1♀, MRAC 168.723.

Zelotes sp. - Abd El-Wakeil *et al.* (2014): Wadi Al-Arj, Taif, Saudi Arabia.

Family **Linyphiidae** Blackwall, 1859

Genus *Prinerigone* Millidge, 1988

♂ *Prinerigone vagans arabica* (Jocqué, 1981)

Only in Saudi Arabia

Erigone vagans arabica - Jocqué, 1981: 111-113, f. 1-3 (D♂), *Erigone vagans arabica* n. ssp. Material examined: male holotype: Wadi Marba, Khamis Mushayt, 2050 m, 17.IV.1976; 1 juvenile male probably belonging to the same taxon: same date as holotype.

Genus *Lepthyphantes* Menge, 1866

Lepthyphantes (?) sp. Jocqué, 1981: 113, Only one specimen was collected, a subadult female from Wadi Khumra, 21.I.1977 (leg. W. Büttiker). It can not be identified to species level.

Genus *Mermessus* O.P.-Cambridge, 1899

Mermessus sp. - Abd El-Wakeil *et al.* (2014): Wadi Al-Arj, Taif, Saudi Arabia.

Unidentified species. - Al-Baha, leg. El-Hawagry: 1♀, 18.4.2012, Al-Mekhwa.

Family **Lycosidae** Sundevall, 1833

Genus *Arctosa* C.L. Koch, 1847

Arctosa ? sp. - Al-Baha, leg. El-Hawagry: 1♀, 2.1.2012, Dhee Ain.

Genus *Evippa* Simon, 1882

♂♀ *Evippa praelongipes* (O.P.-Cambridge, 1870)

Evippa praelongipes (O.P.-Cambridge, 1870) - Alderweireldt, 1991: 369-371, f. 5.1-5 (♀, D♂), *Other material examined*. 7♂♂ 2♀♀: Saudi Arabia, Jeddah region, exact locality and date unknown (1980s), A. Faragalla (5♂♂ DBUJ, 1♂ 1♀ MRAC 171.8819 and MRAC 171.820, 1♂ 1♀ PCMA).

Genus *Hippasa* Simon, 1885

♂ *Hippasa sinai* Alderweireldt & Jocqué, 2005

Hippasa sinai n.sp. - Alderweireldt & Jocqué, 2005: 61-63, f. 38-39 (D♂), Saudi-Arabia: 2♂: Hada Asham area, 21°47'N 039°41'E, nr. 12, 2000–2001, exact date unknown, sweep net alfalfa crop, A. Faragalla (PCMA 1273 and 1274); 1♂: Hada Asham area, 21°47'N 039°41'0"E, nr. 12, 2000–2001, exact date unknown, pitfall, A. Faragalla (PCMA 1272).

Genus *Hogna* Simon, 1885

♂♀ *Hogna ferox* (Lucas, 1838)

Hogna ferox - Abd El-Wakeil *et al.* (2014): Wadi Al-Arj, Taif, Saudi Arabia.

Genus *Ocyale* Savigny, 1825

♂♀ *Ocyale pilosa* (Roewer, 1960)

Ocyale neatalanta n.sp. - Alderweireldt, 1996: 1353-1356, f. 1-3, 5-13, 20, 25 (D♂♀), Saudi-Arabia: 2♂♂: Hoda Alsham area, sweepnetted from alfalfa, A. Faragalla (MRAC 171809); 2♀♀, same locality (MRAC 171811).

Ocyale pilosa (Roewer, 1960) comb.nov. - Alderweireldt & Jocqué, 2005: 63 (♂, S♀).

Genus *Pardosa* C.L. Koch, 1847

Pardosa sp. - Abd El-Wakeil *et al.* (2014): Wadi Al-Arj, Taif, Saudi Arabia.

Genus *Wadicosa* Zyuzin, 1985

♂♀ *Wadicosa fidelis* (O.P.-Cambridge, 1872)

Wadicosa fidelis - Abd El-Wakeil *et al.* (2014): Wadi Al-Arj, Taif, Saudi Arabia.

Family **Mimetidae** Simon, 1881

Ero canionis is recorded by Abd El-Wakeil *et al.* (2014): Wadi Al-Arj, Taif, Saudi Arabia. This maybe a misprint because it is not identified by the same person who identified other species.

Family **Miturgidae** Simon, 1886

Genus *Cheiracanthium* C.L. Koch, 1839

♂♀ *Cheiracanthium molle* L. Koch, 1875

Cheiracanthium molle L. Koch, 1875 - El-Hennawy, 2011: 114-115, f. 1-6 (♂), Material examined: 1♂, 1s♂, Saudi Arabia, Al-Baha, Gebel El-Baher (20°00'N, 41°27'E, elevation 2170m). Coll. M.S. El-Hawagry, 25 May 2011.

Cheiracanthium sp. - Desouky & El-Hennawy (2012): 1j, Al-Bed'e (Ha'il), 22 July 2010, N 27° 26'39" E 40°49'32".

Cheiracanthium sp. - Abd El-Wakeil *et al.* (2014): Wadi Al-Arj, Taif, Saudi Arabia.

Family **Oecobiidae** Blackwall, 1862

Genus *Oecobius* Lucas, 1846

Oecobius sp. - Abha, leg. Sharaf: 1j, 18.I.2004.

Genus *Uroctea* Dufour, 1820

Uroctea sp. - Desouky & El-Hennawy (2012): 1s♂, 1s♀, 1j, Toula Mountain, 1 June 2010, N 25°44'00" E 41°05'42"; Al-Asfar Mountain, 14 August 2011, N 25°59'27" E 40°32'55".

Family **Oonopidae** Simon, 1890

Unidentified species. Fawasan, leg. Sharaf: 2♂ 5♀, 25.II.2005.

Family **Oxyopidae** Thorell, 1870

Genus *Oxyopes* Latreille, 1804

Oxyopes sp. - Al-Baha, leg. El-Hawagry: 1s♂, 4j, 18.4.2012, Al-Mekhwa.

Genus *Peucetia* Thorell, 1869

♂♀ *Peucetia virescens* (O.P.-Cambridge, 1872)

Peucetia virescens - Van Niekerk & Dippenaar-Schoeman, 1994: 48, Material Examined. Saudi Arabia: Beirut, Saïda, Mairuba, Djeniu, 1♂, 1 immature ♀ (MNHN 705). = Lebanon.

Family **Palpimanidae** Thorell, 1870

Unidentified species. - Al-Baha, leg. El-Hawagry: 1♀?, 17.5.2012, Rhaghdan.

Family **Philodromidae** Thorell, 1870

Genus *Halodromus* Muster, 2009

♂♀ *Halodromus barbarae* Muster, 2009

Halodromus barbarae sp.n. - Muster, 2009: 58-60, f. 14, 17-20 (D♂♀), Material examined. Saudi Arabia: Eastern Province: 1♂, Al-Khobar, 26°17'N, 50°12'E, 12 January 1983, leg. E. Heiss (MNHG).

♂♀ *Halodromus patellidens* (Levy, 1977)

Halodromus patellidens (Levy, 1977) - Muster, 2009: 66-69, f. 13, 33-36 (T♂♀ from Ebo), Material examined. Saudi Arabia: Eastern Province: 1♀, Al-Khobar, 26°17'N, 50°12'E, 12 January 1983, leg. E. Heiss (CTh).

Genus *Philodromus* Walckenaer, 1826

Philodromus sp. - Abd El-Wakeil *et al.* (2014): Wadi Al-Arj, Taif, Saudi Arabia.

Genus *Thanatus* C.L. Koch, 1837

Thanatus sp. - Al-Baha, leg. El-Hawagry: 1♀, 13.5.2011, Raghdan; 1j, 8.6.2011, 1s♂, 21.12.2011, Ghabet Shohba; 1♀, 5j, 22.2.2012, Al-Mekhwa.

Genus *Tibellus* Simon, 1875

♂♀ *Tibellus vossioni* Simon, 1884 (Figs. 7-11)

Al-Baha, leg. El-Hawagry: 1♂, 1.6.2011, Gebel El-Baher; 1♂, 8.6.2011, Ghabet Shohba. *Tibellus vossioni* Simon, 1884 - Van den Berg & Dippenaar-Schoeman, 1994: 112, f. 2h, 7h (♂).

Family **Pholcidae** C.L. Koch, 1850

Genus *Artema* Walckenaer, 1837

♂♀ *Artema atlanta* Walckenaer, 1837

Artema atlanta Walckenaer, 1837 - Desouky & El-Hennawy (2012): 3♂, 4♀, 1s♂, 3j, Ha'il City, 22 July 2010, N 27°32'35" E 41°42'15"; Gafar, 15 August 2010, N 27°24'58" E 41°36'15"; Hulaifa, 15 August 2010, N 25°59'38" E 40°49'01"; Samiraa, 15 August 2010, N 26°29'29" E 42°07'28".

Unidentified species. - Al-Baha, leg. El-Hawagry: 1j, 2.1.2012, Dhee Ain.

Family **Salticidae** Blackwall, 1841

Genus *Aelurillus* Simon, 1884

♂♀ *Aelurillus faragallai* Prószyński, 1993

Aelurillus faragallai n.sp. - Prószyński (1993): 29-32, figs. 1-8, Holotype: ♂, Saudi Arabia: Hada Alsham, alfalfa field, pitfalls, date not given, A.A. Faragalla, NHMB. - Paratypes: 3♂♂, 2♀♀, same data as holotype [association of ♀♀ with ♂♂ and their conspecificity uncertain]; 3♂♂, Tizan-Bayesh area. - Allotype: 1♀, same data as holotype.

Aelurillus sp. - Abd El-Wakeil *et al.* (2014): Wadi Al-Arj, Taif, Saudi Arabia.

Genus *Afraflacilla* Berland & Millot, 1941

♂♀ *Afraflacilla asorotica* (Simon, 1890)

Pseudicius asoroticus Simon, 1890 - Prószyński (1993): 48-53, figs. 41-47, Material: 1♀, here designated as Lectotype: "10775 *Ps.[eudicius] asoroticus* Ch. Othman Aden!", date not given, Simon, MNHNP. - 4♂♂, 5♀♀, 4 immature specimens, here designated as Paralectotypes: "10775 *Ps.[etrdicius] asoroticus* Ch. Othman Aden!", date not given, Simon, MNHNP. - Comparative material: 2♂♂, 2♀♀ of *Pseudicius wadis* Prószyński, 1989 (separated from a series of specimens labelled: "10775 *Ps.[eudicius] asoroticus* Ch. Othman Aden!"), date not given, Simon, MNHNP.

Pseudicius asoroticus - Prószyński (2003): 148-149, f. 628-629 (♀), Saudi Arabia.

♂♀ *Afraflacilla wadis* (Prószyński, 1989)

Pseudicius wadis n.sp. - Prószyński (1989): 57-59, figs. 64-68, Material: Saudi Arabia: Holotype: ♂ Wadi Yamaniyah, 1100 m, 31.III.1980, W. Büttiker. - Paratypes: 1♀, (allotype), 2♂♂ (=♂ # 3). 3♀♀, Wadi Yamaniyah, 1100 m, 31.III.1980, W. Büttiker; 1♀, Kushm Dibi, 20.IV.1978, W. Büttiker; 1♀, Wadi Karrar, 10.II.1980; 1♂, Wadi ad Dilla, 550 m, 17.X.1979, W. Büttiker; 1♂, Sanam, 26.VIII.1980, W. Büttiker; 1♂, Wadi Thamamah, 9.XI.1979, W. Büttiker; 1♂, Wadi Majarish, 3.V.1984, W. Büttiker. All NHMB and in coll. J. Prószyński.

Genus *Bianor* Peckham & Peckham, 1886

Bianor sp. - Prószyński (1989): 32-33, figs. 1-2, 1♀, Saudi Arabia: Hakimah. 15.-18.11.1980, W. Büttiker, NHMB.

Bianor sp. - Prószyński (1993): 33, ♀ = the same of 1989 paper, Material: Saudi Arabia: 1♀, Western Region, Khulais valley, pitfall traps, date not given, A.A. Faragalla, NHMB. The same species was collected by Prof. W. Büttiker from Hakimah (Prószyński 1989: 32, figs. 1-2). It is probably *Bianor albobimaculatus* (Lucas, 1846), but further revisionary study is needed.

Genus *Habrocestum* Simon, 1876

♀ *Habrocestum arabicum* Prószyński, 1989

Only in Saudi Arabia

Habrocestum arabicum n.sp. - Prószyński (1989): 33-34, figs. 3-4, Material, Holotype ♀: Saudi Arabia: Wadi Zein, 5.11.1979, W. Büttiker, NHMB.

Genus *Heliophanillus* Prószyński, 1989

♂♀ *Heliophanillus fulgens* (O.P.-Cambridge, 1872)

Heliophanillus arabicus n.sp. - Prószyński (1989): 35-37, figs. 9-11, Material, Holotype:

♂, Saudi Arabia: Riyadh, 4.XII. 1979. A. S.Talhok, NHMB.

Genus *Heliophanus* C.L. Koch, 1833

♂♀ *Heliophanus saudis* Prószyński, 1989

Heliophanus (Heliocapensis) saudis n.sp. - Prószyński (1989): 35, 37, figs. 5-8, Material, Holotype: ♂, Saudi Arabia: Thanomah, 1950 m, 11.IV.1980, W. Büttiker, NHMB.

Heliophanus saudis - Al-Baha, leg. El-Hawagry: 2♂, 14.3.2012, W. Turabet Zahran.

Genus *Langona* Simon, 1901

♂♀ *Langona pallida* Prószyński, 1993

Langona pallida n.sp. - Prószyński (1993): 33-35, figs. 9-11, Holotype: ♂ (with palp separated), Saudi Arabia: Hada Alsham, alfalfa field, pitfall, date not given, A.A. Faragalla, NHMB. - Paratype: 1♂, same data as holotype.

Genus *Menemerus* Simon, 1868

♂♀ *Menemerus animatus* O.P.-Cambridge, 1876

Menemerus animatus O.P.-Cambridge, 1876 - Prószyński (1993): 35-37, figs. 12-15, Material: Saudi Arabia: 1♂, Western Region, Khulais valley, pitfall traps, date not given, A.A. Faragalla, NHMB.

♂ *Menemerus arabicus* Prószyński, 1993

Only in Saudi Arabia

Menemerus arabicus n.sp. - Prószyński (1993): 37-39, figs. 16-19, Holotype: ♂, Western Region, Khulais valley, pitfall traps, date not given, A.A. Faragalla, NHMB.

♂♀ *Menemerus fagei* Berland & Millot, 1941

Menemerus cf. *bivittatus* (Dufour, 1831) - Prószyński (1989): 37-39, figs. 12-17, Material: Saudi Arabia: 1♂, 4♀♀, Riyadh, 5.-15.XII. 1979, A.S. Talhouk, NHMB; 1♂, Al Khardi, 2.I.1980, A.S. Talhouk, NHMB.

Genus *Mogrus* Simon, 1882

♂♀ *Mogrus fulvovittatus* Simon, 1882

Mogrus fulvovittatus Simon, 1882 - Prószyński (1989): 41-42, figs. 21-22, Material: 1♂, Saudi Arabia: Wadi Phi Khul, Jebel, 20.II.1980, W. Büttiker, NHMB.

♂♀ *Mogrus mathisi* (Berland & Millot, 1941)

Mogrus dillae n.sp. - Prószyński (1989): 40, figs. 18-20, Material: Holotype: ♀, Saudi Arabia: Wadi ad Dilla, 550 m, 17.X.1979, W. Büttiker, NHMB.

♂♀ *Mogrus mirabilis* Wesolowska & van Harten, 1994

Mogrus mirabilis Wesolowska & van Harten, 1994 - Logunov, 2004: 88, f. 8-14 (♀, D♂), Distribution. .. Saudi Arabia.

Mogrus mirabilis Wesolowska & van Harten, 1994 - Desouky & El-Hennawy (2012): 1♂, Mo'Arrash, 1 June 2010, N 25°59'31" E 40°58'15".

♀ *Mogrus sinaicus* Prószyński, 2000

Mogrus sinaicus sp.n. - Prószyński, 2000: 255-256, f. 89-92 (D♀), Paratype: 1♀ (NHM), "Mogrus sp. 1", Saudi Arabia, Khasm Khafs, 6.IV.1980, leg. W. Büttiker.

Mogrus sinaicus Prószyński, 2000 - Prószyński, 2003: 105-107, f. 401, 433-435 (♀), Saudi Arabia - Khasm Khafs.

Genus *Myrmarachne* MacLeay, 1839

♂♀ *Myrmarachne tristis* (Simon, 1882)

Myrmarachne tristis (Simon, 1882) - Prószyński (1989): 44-47, figs. 37-43, Material: 1♂, Saudi Arabia: Wadi ad Dilla, 550 m, 17.X.1979, W. Büttiker, NHMB. (+ numerous immature specimens).

Genus *Neaetha* Simon, 1884

♂♀ *Neaetha oculata* (O.P.-Cambridge, 1876)

Neaetha oculata (O.P.-Cambridge, 1876) - Prószyński (1993): 39-43, figs. 20-27, Material: Saudi Arabia: 1♂, Hada Alsham, alfalfa field, pitfall and sweeping, date not given, A.A. Faragalla, NHMB.

Neaetha oculata - Abd El-Wakeil *et al.* (2014): Wadi Al-Arj, Taif, Saudi Arabia.

Genus *Pellenes* Simon, 1876

♂ *Pellenes hadaensis* Prószyński, 1993

Only in Saudi Arabia

Pellenes hadaensis n.sp. - Prószyński (1993): 43-44, figs. 28-31, Holotype: ♂, Saudi Arabia: Hada Alsham, alfalfa field, pitfall and sweeping, date not given, A.A. Faragalla, NHMB.

♂♀ *Pellenes hedjazensis* Prószyński, 1993

Pellenes heqazensis n.sp. - Prószyński (1993): 44-46, figs. 32-36, Holotype: ♂ (specimen with distinct dark abdominal stripes), Saudi Arabia: Hijaz region, Jeddah area, VIII.1985-IV.1986, A.A. Faragalla, AMNH. - Paratypes : 2♂♂, same data as holotype.

Genus *Plexippoides* Prószyński, 1984

♂♀ *Plexippoides flavescens* (O.P.-Cambridge, 1872)

Plexippoides arabicus n.sp. - Prószyński (1989): 47-49, figs. 44-45, Material: Holotype: 1♂, Saudi Arabia: Sharoura, 27.III.1979, A.S.Talhok & W. Büttiker, NHMB. - Paratypes: 1♂, Saudi Arabia, Al Khardi, 2.I.1980, A. S.Talhok & W. Büttiker, coll. J. Prószyński.

Genus *Plexippus* C.L. Koch, 1846

♂♀ *Plexippus paykulli* (Audouin, 1825)

Plexippus paykulli (Savigny & Audouin, 1827) - Prószyński (1993): 47, Material: Saudi Arabia: 2♀♀, Western Region, Khulais village, old house, date not given; 1♂, Jeddah, Nissan office, date not given; 2♂♂, Rehab district, date not given. All A.A. Faragalla, NHMB.

Plexippus sp.? - Desouky & El-Hennawy (2012): 1j(s♀); 1♀; 1j Unidentified species, Om Sanman, 25 May 2010, N 40°53'35" E 28°07'12"; Aga Mountain, 1 August 2011, N 27°28'10" E 40°15'05".

Genus *Pseudicius* Simon, 1885

♂♀ *Pseudicius braunsi* Peckham & Peckham, 1903

Pseudicius tripunctatus n.sp. - Prószyński (1989): 53-54, figs. 53-55, Material: Holotype: ♀, Saudi Arabia: Ash Sharayi, 24.IX.1978, W. Büttiker, NHMB.

♀ *Pseudicius sheherezadae* Prószyński, 1989

Pseudicius sheherezadae n.sp. - Prószyński (1989): 49-50, figs. 46-47, Material: Holotype: ♀, Saudi Arabia: Thanomah, 2140 m, 11.IV.1980, W. Büttiker, NHMB.

♂ *Pseudicius shirinae* Prószyński, 1989

Only in Saudi Arabia

Pseudicius shirinae n.sp. - Prószyński (1989): 50-51, figs. 48-49, Material: Holotype: ♂, Saudi Arabia: Wadi Harth. 28.IX.1978, W. Büttiker, NHMB.

♂ *Pseudicius sindbadi* Prószyński, 1989

Only in Saudi Arabia

Pseudicius sindbadi n.sp. - Prószyński (1989) 51-52, figs. 50-52, Material: Holotype: ♂, Saudi Arabia: Thanomah, 2140 m, 11.IV.1980, W. Büttiker, NHMB. - Paratypes: 1♂, same data, coll. J. Prószyński; 1 juv., same data, coll. J. Prószyński.

♂♀ *Pseudicius tamaricis* Simon, 1885

Pseudicius tamaricis Simon, 1885 - Prószyński (1989): 53-57, figs. 56-63, Material: Saudi Arabia: 5♂♂, 2♀♀, 3 juv., Hofuf, 21.V.1980, A.S. Talhouk; 1♂, Riyadh, 5.XII.1979, A.S. Talhouk; 1♀, 1 juv., Jebel an Nir, 990 m, 12.IX.1979, W. Büttiker, NHMB.

Genus *Stenaelurillus* Simon, 1886

Stenaelurillus sp. - Prószyński (1993): 47, Material: Saudi Arabia: 1♂ (both palps missing), Hada Alsham, alfalfa field, pitfall and sweeping, date not given, A.A. Faragalla, NHMB.

Genus *Thyene* Simon, 1885

♂♀ *Thyene imperialis* (Rossi, 1846)

Thyene imperialis (Rossi, 1846) - Prószyński (1989): 59-63, figs. 69-72, Material: Saudi Arabia: 11♂♂, 8♀♀, Riyadh; 25.IX. 1978, 10.II., 13.,25.XI., 1,4.,5.,12.,15.,16.XII.1979, 12.II.1980, Al Khardj, 19.1.1980, A.S. Talhouk, NHMB; 1♂, Bani Sharfa, 12.II.1980, W. Büttiker, NHMB; 1♂, Hofuf, 3.I.1980, W. Büttiker, NHMB; 1♀, Riyadh, 20.VIII.1981, W. Büttiker, NHMB.

Thyene imperialis (Rossi, 1846) - Prószyński (1993): 48, Material: Saudi Arabia: 3♂♂, Western Region, Khulais valley, pitfall traps, on green plant, date not given, A.A. Faragalla, NHMB.

Thyene imperialis - Al-Baha, leg. El-Hawagry: 1♂, 22.2.2012, 1♂, 1s♂, 2j, 18.4.2012, Al-Mekhwa.

Genus *Yllenus* Simon, 1868

♂♀ *Yllenus saliens* O.P.-Cambridge, 1876

Yllenus arabicus n.sp. - Prószyński (1993): 48-49, figs. 37-40, Holotype: ♂, Saudi Arabia: Hada Alsham, alfalfa field, pitfall and sweeping, date not given, A.A. Faragalla, NHMB.

Family *Scytodidae* Blackwall, 1864

Genus *Scytodes* Latreille, 1804

♂♀ *Scytodes univittata* Simon, 1882

Scytodes univittata - Abd El-Wakeil *et al.* (2014): Wadi Al- Arj, Taif, Saudi Arabia.

Scytodes sp. - Desouky & El-Hennawy (2012): 2j Rujama Village, 13 August 2011, N 27°56'40" E 42°07'12".

Family **Selenopidae** Simon, 1897

Genus **Selenops** Latreille, 1819

Selenops sp. - Desouky & El-Hennawy (2012): 1♀ 1j, Ash-Shuwayms, 30 July 2010, N 26°13'13" E 40°24'17".

Family **Sicariidae** Keyserling, 1880

Genus **Loxosceles** Heineken & Lowe, 1832

♂♀ **Loxosceles rufescens** (Dufour, 1820)

Loxosceles rufescens (Dufour, 1820) - Desouky & El-Hennawy (2012): 2♂, Rujama Village, 13 August 2011, N 27°56'40" E 42°07'12".

Family **Sparassidae** Bertkau, 1872

Genus **Cebrennus** Simon, 1880

♂♀ **Cebrennus aethiopicus** Simon, 1880

Cebrennus aethiopicus Simon, 1880 - Jäger, 2000: 176-178, f. 49-55 (♂, D♀), Material examined: 1 male (PJ 1348, with label: Saudi Arabien, W. Büttiker / Jeddah [= Gidda, Djidda], 31.I.1984 / Sparassidae male [Heteropodidae]). 1 female (PJ 1349, with label: Saudi Arabien, W. Büttiker / Wadi Hanaq, 100 m, 10.II.1984, 22°49'N, 39°22'E/ female Heteropodidae, g[enus]. ?, det. J.A. Murphy 1988.). 1 female (PJ 1350, with label: Saudi Arabien, W. Büttiker / Harithi, 20./21. [?] 1985, 21°18'N, 40°18'E/ female Heteropodidae, g[enus]. ?, det. J.A. Murphy 1988.). [Formerly dried out; no measurements were taken]), all NHMB.

♂ **Cebrennus intermedius** Jäger, 2000

Only in Saudi Arabia

Cebrennus intermedius sp.n. - Jäger, 2000: 178-179, f. 61-67 (D♂), Type material. 1 male holotype (PJ 1365, with label: Chicago Nat. Hist. Museum, 3 spiders, Dhahran, opp. Bahrein Is., Saudi Arabia, Col. + pres. by T.C. Barger + L.M. Snyder, Rec'd IV:5:44), 2 males paratypes (PJ 1366, 1367, with same data as holotype) FMNH (PJ 1365, 1366), SMF (PJ 1367).

Genus **Cerbalus** Simon, 1897

Cerbalus sp. ? - Desouky & El-Hennawy (2012): 1♂, 2j, NADEC Co, 1 June 2010, N 27°30'16" E 42°40'15".

Genus **Eusparassus** Simon, 1903

♂♀ **Eusparassus arabicus** Moradmand, 2013

Eusparassus arabicus spec. nov. - Moradmand, 2013: 19-23, f. 7a-e, 8a-c, 47d-e, 59e-f (D♂♀), Type material. Holotype: male, Saudi Arabia: *Mintaqat ar Riyad*: Wadi Mizbil [N 24° 30', E 46° 25'], 13 April 1977, W. Büttiker leg. (NMB-ARAN 20666). Paratypes (4♂♂, 1♀): Saudi Arabia: 1♂, same data as for holotype (SMF); *Mintaqat al Hail*: 1♀, Wadi Naqben [in Jebel Aja Mountain], N 27°41', E 41°38', 1050 m, 27 May 1981, W. Büttiker leg. (NMB-ARAN 20667); *Mintaqat Makkah*: 1♂, Abha, Asir Mountains, 2200 m, April 1977, Dr. C. Lowe leg. (NHM); 1♂, Abulat Island, Red Sea, "Mission de la Calypso Mer Rouge 1952", Cherbounier leg. (MNHN).

♂♀ **Eusparassus laevatus** (Simon, 1897) (Figs. 12-14)

Eusparassus laevatus (Simon, 1897) comb. nov. - Moradmand, 2013: 16-19, f. 4a-c, 5a-e, 6a-d, 47a-c, 59c-d (T♂ from *Olios*, D♂), 1♂, Arabian, A.B. Derewal leg. (NHM 99.12.2.16); *Al Bahah*: 1♂, Bani Sar, 29 February–7 March 1984, W. Büttiker leg. (NMB); 2♂♂, 1♀, An-Namas, 17 April 1980, 2380 m, W. Büttiker leg. (NMB); 1♂, 1♀,

An-Namas, 19 September 1980, 2380 m, W. Büttiker leg. (NMB); 1♀, Wadi Damad, 800 m, 24 September 1981, W. Büttiker leg. (NMB).

Eusparassus laevatus - Al-Baha, leg. El-Hawagry: 1♀, 13.5.2011, Raghdan.

♂♀ *Eusparassus walckenaeri* (Audouin, 1825)

Eusparassus walckenaeri (Audouin, 1825) - Desouky & El-Hennawy (2012): 2♀, 3j, Gulaib, 29 April 2010, N 28°36'40" E 42°24'34"; Ha'il City, 29 April 2010, N 27°33'11" E 41°41'11"; Setehat Juppa, 29 April 2010, N 27°58'18" E 40°49'13"; Great Nofood, 1 June 2010, N 27°39'25" E 40°57'54"; NADEC Co, 1 June 2010, N 27°30'16" E 42°40'15". [This species may be misidentified. The studied specimens may belong to *Eusparassus arabicus*. See note 4, p. 43.]

Family **Theraphosidae** Thorell, 1869

Genus *Chaetopelma* Ausserer, 1871

♂♀ *Chaetopelma olivaceum* (C.L. Koch, 1841)

Chaetopelma olivaceum (C.L. Koch 1841) - Guadanucci & Gallon, 2008: 36-39, f. 1-10 (♂♀, S), Additional material examined: Saudi Arabia: 1♂2♀ (SMF 2661) E. Rüppell leg.

Unidentified species. - Desouky & El-Hennawy (2012): 1j, Rujama Village, 13 August 2011, N 27°56'40" E 42°07'12".

Family **Theridiidae** Sundevall, 1833

Genus *Latrodectus* Walckenaer, 1805

♂♀ *Latrodectus dahli* Levi, 1959

Latrodectus dahli Levi, 1959 - Knoflach & van Harten (2002): 334 - Saudi Arabia: 1♀, Riyadh surroundings, 24°43'N 46°45'E, 600 m, X.1976, W. Büttiker, NHMB; 1♀, al-Khardji, 19.I.1980, A.M. Talhouk, NHMB; 1♀, 35 km NE of Dawadimi, 810 m, III.1983, W. Büttiker, NHMB.

♂♀ *Latrodectus geometricus* C.L. Koch, 1841

Latrodectus geometricus C.L. Koch, 1841 - Knoflach & van Harten (2002): 340 - Saudi Arabia: 1 juv. ♀, Wadi ad-Dilla, 550 m, 17.X.1979, W. Büttiker, NHMB.

♂♀ *Latrodectus renivulvatus* Dahl, 1902

Latrodectus renivulvatus Dahl, 1902 - Knoflach & van Harten (2002): 353 - Saudi Arabia: 1♀, Riyadh, 24°43'N 46°45'E, 600 m, 24.V.1981, W. Büttiker, NHMB; 1♀, BAC Camp, Khamis Mushayt, 18°18'N 42°48'E, 2000 m, 14.IV.1980, W. Büttiker, NHMB.

♂♀ *Latrodectus tredecimguttatus* (Rossi, 1790)

Latrodectus tredecimguttatus (Rossi, 1790) - Desouky & El-Hennawy (2012): 2♀, 1s♀, Salma Mountain, 25 May 2010, N 42°35'15" E 27°15'02"; Aga Mountain, 21 August 2010, N 27°31'20" E 40°16'02".

Genus *Paidiscura* Archer, 1950

♂♀ *Paidiscura dromedaria* (Simon, 1880)

Paidiscura dromedaria (Simon, 1880) - Knoflach & Thaler, 2000: 429-431, f. 30, 33, 36, 41-43, 58 (♂♀, S), Saudi Arabia: Dhahran, Al Khobar, sand dune, 1♀ 5.6.1982, leg. Heiss. Wadi Nimar 21°08'N/40°58'E 1500 m, 1♀ juv NMB 19.-20.5.1983, leg. Büttiker.

Genus *Steatoda* Sundevall, 1833

♂♀ *Steatoda paykulliana* (Walckenaer, 1805)

Steatoda paykulliana - Abd El-Wakeil *et al.* (2014): Wadi Al-Arj, Taif, Saudi Arabia.

Genus *Theridion* Walckenaer, 1805

♀ *Theridion spinitarse* O.P.-Cambridge, 1876

Theridion spinitarse O.P.-Cambridge, 1876 - Knoflach, Rollard & Thaler, 2009: 256-257, f. 78-79 (♀), Saudi Arabia: Wadi Karrar, 3♀ (NHMB), 10.2.1980, leg. W. Büttiker.

Unidentified species. Al-Baha, leg. El-Hawagry: 1♀, 17.5.2012, Rhaghdan.

Family **Thomisidae** Sundevall, 1833

Genus *Ansiea* Lehtinen, 2005

♂♀ *Ansiea buettikeri* (Dippenaar-Schoeman, 1989)

Only in Saudi Arabia

Misumena buettikeri n.sp. - Dippenaar-Schoeman, 1989: 27-29, f. 7a-d (D♂♀), Holotype:

♂, Saudi Arabia: Wadi Majarish, 7.-18.II.1980, W. Büttiker, NHMB. – Paratypes: 2♀♀, Saudi Arabia: Wadi Majarish, 7. & 10.II.1980, W. Büttiker, NHMB.

Genus *Ozyptila* Simon, 1864

♂♀ *Ozyptila rigida* (O.P.-Cambridge, 1872)

Ozyptila rigida (O. Pickard-Cambridge, 1872) - Dippenaar-Schoeman, 1989: 26, f. 5 (♀), Saudi Arabia: 1♀, Al Dehaba, 10.X.1979, W. Büttiker.

Genus *Runcinia* Simon, 1875

♂♀ *Runcinia grammica* (C.L. Koch, 1837) (Figs. 15-18)

Runcinia grammica - Al-Baha, leg. El-Hawagry: 1♂, 2s♂, 11j, 22.2.2012, 1♂, 3j, 18.4.2012, Al-Mekhwa.

Genus *Synema* Simon, 1864

♂♀ *Synema diana* (Audouin, 1825)

Synaema diana (Audouin, 1826) - Dippenaar-Schoeman, 1989: 30, f. 8 (♂), Saudi Arabia: 1♂, 4 juveniles, Wadi Hanifa, 7.V.1976, W. Büttiker; 1 juvenile, Bani Rizam, 12.IV.1980, W. Büttiker; 1 juvenile, Thanomah, 2140 m alt, 11.IV.1980, W. Büttiker; 1 juvenile, Wadi Khumra, 6.IX.1976, W. Büttiker; 2 juveniles, Wadi Majarish, 10.II.1980, W. Büttiker; 2 juveniles, Wadi Mizbil, 25.II.1977, W. Büttiker; 1 juvenile, Wadi Shija (desert), 4.XI.1976, W. Büttiker.

Synema sp. - Al-Baha, leg. El-Hawagry: 1j, 22.2.2012, Al-Mekhwa.

Genus *Thomisus* Walckenaer, 1805

♂♀ *Thomisus arabicus* Simon, 1882

Thomisus arabicus Simon, 1882 - Dippenaar-Schoeman & van Harten, 2007: 173, f. 5-6 (♀), Distribution. .. Saudi Arabia.

♂♀ *Thomisus bidentatus* Kulczyński, 1901

Thomisus bidentatus Kulczyński, 1901 - Dippenaar-Schoeman, 1989: 22-23, f. 1 (♂), Saudi Arabia: 1♂, Wadi Majarish, 7.-18.II.1980, W. Büttiker.

Thomisus bidentatus - Al-Baha, leg. El-Hawagry: 1♂, 2s♂, 1s♀, 4j, 1.6.2011, 1s♀, 25.5.2011, Gebel El-Baher; 1s♀, 13.5.2011, Rhaghdan; 2s♀, 13j, 14.3.2012, W. Turabet Zahran.

♂♀ *Thomisus citrinellus* Simon, 1875

Thomisus citrinellus Simon, 1875 - Dippenaar-Schoeman, 1989: 23, f. 2a-b (♂♀), Saudi Arabia: 3♀♀, Riyadh, 15.XII.1979, A.S. Talhouk; 1♀, 1♂, Riyadh, 25.XII.1979, A.S. Talhouk; 3♀♀, Riyadh, 4.XII.1979, A.S. Talhouk; 4♀♀, Al Khardj, 19.I.1980, A.S. Talhouk; 1♀, Wadi Majarish, 250 m alt, 7.IV.1980, W. Büttiker.

♂♀ *Thomisus daradioides* Simon, 1890

Thomisus daradioides Simon, 1890 - Dippenaar-Schoeman & van Harten, 2007: 177-179, f. 16-18 (♂♀), p.179 Distribution. .. Saudi Arabia.

♂♀ *Thomisus zyuzini* Marusik & Logunov, 1990

T. onustus Dippenaar-Schoeman, 1989: 24, f. 3a-b (♂♀, misidentified), Saudi Arabia: 1♂, Riyadh (radio station), 18.II.1975, W. Büttiker; 1♀, Riyadh, 25.IX.1978, A.S. Talhouk; 1♂, Wadi Shaib Luha, 15.I.1977, W. Büttiker; 1♀, 1 immature ♀, Wadi Hanifa, 7.V.1976, W. Büttiker; 1♂, Wadi Durmah, 27.IV.1976, W. Büttiker & W. Wittmer; 1♂, Chureis, 3.VI.1976, W. Büttiker.

Thomisus zyuzini Marusik & Logunov, 1990 - Marusik & Logunov, 1995: 144-145, f. 19-20 (D♂), Distribution. ..Saudi Arabia.

Genus *Tmarus* Simon, 1875

♂♀ *Tmarus longicaudatus* Millot, 1942

Tmarus longicaudatus Millot, 1942 - Dippenaar-Schoeman, 1989: 24-25, f. 4a-c (♀), Saudi Arabia: 1♀, Wadi Hanifa, 7.V.1976, W. Büttiker; 1 juvenile, Wadi Mizbil, 25.II.1977, W. Büttiker; 3 juveniles, Wadi Mizbil, 10.-11.VI.1976, W. Büttiker; 1 juvenile, Quwayiyah, 2.-13.III.1978, W. Büttiker; 1 immature ♀, 2 juveniles, Wadi Khumra, 21.I.1977, W. Büttiker; 1 juvenile, Wadi Khumra, 9.-10.IX.1976, W. Büttiker; 1 juvenile, Wadi Tabala, 20.X.1979, W. Büttiker; 1 juvenile, Wadi Wajj (18 km SW of Taif) 1800 m alt, 5.X.1979, W. Büttiker.

Genus *Xysticus* C.L. Koch, 1835

♂♀ *Xysticus tristrami* (O.P.-Cambridge, 1872)

Xysticus tristrami (O. Pickard-Cambridge, 1872) - Dippenaar-Schoeman, 1989: 27, f. 6a-b (♂♀), Saudi Arabia: 1♀, village Qaraah, 2000 m alt, 16.IV.1976, W. Büttiker & W. Wittmer; 1♂, BAC Camp Khamis Mushayt, 2000 m alt, 15.XI.1977, W. Büttiker; 1♂, Namas, 2330 m alt, II.1981, G. Vogel.

Family **Uloboridae** Thorell, 1869

Genus *Uloborus* Latreille, 1806

Uloborus sp. - Abd El-Wakeil *et al.* (2014): Wadi Al-Arj, Taif, Saudi Arabia.

Family **Zodariidae** Thorell, 1881

Genus *Lachesana* Strand, 1932

♂ *Lachesana insensibilis* Jocqué, 1991

Only in Saudi Arabia

Lachesana insensibilis n.sp. - Jocqué, 1991: 37-39, f. 59 (D♂), Type Material: Holotype male: Saudi Arabia, Khulais Valley, N of Jeddah, 1987, pitfall, A. Faragalla (MRAC 169818).

Genus *Trygetus* Simon, 1882

♀ *Trygetus riyadhensis* Ono & Jocqué, 1986

Trygetus riyadhensis n.sp. - Ono & Jocqué, 1986: 9-10, f. 5-7 (D♀), Material: Holotype: ♀, Saudi Arabia: Wire-less Station, Riyadh, 18.II.1975, W. Büttiker, NHMB 2360.

Genus *Zodarion* Walckenaer, 1826

♂♀ *Zodarion buettikeri* (Ono & Jocqué, 1986)

Only in Saudi Arabia

Acanthinozodium buettikeri n.sp. - Ono & Jocqué, 1986: 7-9, f. 1-4 (D♂♀), Material: Holotype: ♀, Saudi Arabia: Wadi Khumra, 60 km NW of Riyadh, 16.XI.1979, W. Büttiker, NHMB 2359a. - Paratypes: 1♂, same locality as holotype, 19.XI.1977, W. Büttiker, NHMB 2359b; 1♂, Saudi Arabia: Hieth, 40 km S of Riyadh, 13.V.1977, W. Büttiker, NHMB 2359c.

List of Spiders of Saudi Arabia

* = endemic, only in Saudi Arabia

Family **Agelenidae** C.L. Koch, 1837

Family **Araneidae** Clerck, 1757

Family **Corinnidae** Karsch, 1880

Family **Eresidae** C.L. Koch, 1845

Family **Gnaphosidae** Pocock, 1898

Poecilochroa senilis (O.P.-Cambridge, 1872)

Pterotricha lesserti Dalmas, 1921

Synaphosus khashm Ovtsharenko, Levy & Platnick, 1994 *

Synaphosus syntheticus (Chamberlin, 1924)

Zelotes laetus (O.P.-Cambridge, 1872)

Family **Linyphiidae** Blackwall, 1859

Leptyphantus sp.

Family **Lycosidae** Sundevall, 1833

Evippa praelongipes (O.P.-Cambridge, 1870)

Hogna ferox (Lucas, 1838)

Pardosa sp.

Family **Mimetidae** Simon, 1881

Family **Miturgidae** Simon, 1886

Family **Oecobiidae** Blackwall, 1862

Oecobius sp.

Family **Oonopidae** Simon, 1890

Family **Oxyopidae** Thorell, 1870

Oxyopes sp.

Family **Palpimanidae** Thorell, 1870

Family **Philodromidae** Thorell, 1870

Halodromus patellidens (Levy, 1977)

Thanatus sp.

Family **Pholcidae** C.L. Koch, 1850

Family **Salticidae** Blackwall, 1841

Aelurillus faragallai Prószyński, 1993

Afraflacilla wadis (Prószyński, 1989)

Habrocestum arabicum Prószyński, 1989 *

Heliophanus saudis Prószyński, 1989

Menemerus animatus O.P.-Cambridge, 1876

Menemerus fagei Berland & Millot, 1941

Mogrus mathisi (Berland & Millot, 1941)

Mogrus sinaicus Prószyński, 2000

Neaetha oculata (O.P.-Cambridge, 1876)

Pellenes hedjazensis Prószyński, 1993

Plexippus paykulli (Audouin, 1825)

Benoitia lepida (O.P.-Cambridge, 1876)

Stegodyphus lineatus (Latreille, 1817)

Micaria sp.

Pterotricha dalmasi Fage, 1929

Setaphis subtilis (Simon, 1897)

Trachyzelotes jaxartensis (Kroneberg, 1875)

Prinerigone vagans arabica (Jocqué, 1981) *

Mermessus sp.

Arctosa sp.

Hippasa sinai Alderweireldt & Jocqué, 2005

Ocyale pilosa (Roewer, 1960)

Wadicosa fidelis (O.P.-Cambridge, 1872)

Cheiracanthium molle L. Koch, 1875

Uroctea sp.

Peucezia sp.

Halodromus barbarae Muster, 2009

Philodromus sp.

Tibellus vossioni Simon, 1884

Artema atlanta Walckenaer, 1837

Afraflacilla asorotica (Simon, 1890)

Bianor sp.

Heliophanillus fulgens (O.P.-Cambridge, 1872)

Langona pallida Prószyński, 1993

Menemerus arabicus Prószyński, 1993 *

Mogrus fulvovittatus Simon, 1882

Mogrus mirabilis Wesolowska & van Harten, 1994

Myrmarachne tristis (Simon, 1882)

Pellenes hadaensis Prószyński, 1993 *

Plexippoides flavescens (O.P.-Cambridge, 1872)

Pseudicius braunsi Peckham & Peckham, 1903

Pseudicius sheherezadeae Prószyński, 1989
Pseudicius sindbadi Prószyński, 1989 *
Stenaelurillus sp.
Yllenus saliens O.P.-Cambridge, 1876
 Family **Scytodidae** Black wall, 1864
 Family **Selenopidae** Simon, 1897
 Family **Sicariidae** Keyserling, 1880
 Family **Sparassidae** Bertkau, 1872
Cebrennus aethiopicus Simon, 1880
Cerbalus sp.
Eusparassus laevatus (Simon, 1897)
 Family **Theraphosidae** Thorell, 1869
 Family **Theridiidae** Sundevall, 1833
Latrodectus geometricus C.L. Koch, 1841
Latrodectus tredecimguttatus (Rossi, 1790)
Steatoda paykulliana (Walckenaer, 1805)
 Family **Thomisidae** Sundevall, 1833
Ozyptila rigida (O.P.-Cambridge, 1872)
Synema diana (Audouin, 1825)
Thomisus bidentatus Kulczyński, 1901
Thomisus daradioides Simon, 1890
Tmarus longicaudatus Millot, 1942
 Family **Uloboridae** Thorell, 1869
 Family **Zodariidae** Thorell, 1881
Trygetus riyadhensis Ono & Jocqué, 1986

Pseudicius shirinae Prószyński, 1989 *
Pseudicius tamaricis Simon, 1885
Thyene imperialis (Rossi, 1846)

Scytodes univittata Simon, 1882
Selenops sp.
Loxosceles rufescens (Dufour, 1820)

Cebrennus intermedius Jäger, 2000 *
Eusparassus arabicus Moradmand, 2013
Eusparassus walckenaeri (Audouin, 1825)
Chaetopelma olivaceum (C.L. Koch, 1841)
Latrodectus dahli Levi, 1959
Latrodectus renivulvatus Dahl, 1902
Paidiscura dromedaria (Simon, 1880)
Theridion spinitarse O.P.-Cambridge, 1876
Ansiea buettikeri (Dippenaar-Schoeman, 1989)*
Runcinia grammica (C.L. Koch, 1837)
Thomisus arabicus Simon, 1882
Thomisus citrinellus Simon, 1875
Thomisus zyuzini Marusik & Logunov, 1990
Xysticus tristrami (O.P.-Cambridge, 1872)
Uloborus sp.
Lachesana insensibilis Jocqué, 1991 *
Zodarion buettikeri (Ono & Jocqué, 1986) *

Family	Genera	Species	Endemic
AGELENIDAE	1	1	-
ARANEIDAE	-	-	-
CORINNIDAE	-	-	-
ERESIDAE	1	1	-
GNAPHOSIDAE	7	8	1
LINYPHIIDAE	3	1	1
LYCOSIDAE	7	5	-
MIMETIDAE	-	-	-
MITURGIDAE	1	1	-
OECOBIIDAE	2	-	-
OONOPIDAE	-	-	-
OXYOPIDAE	2	-	-
PALPIMANIDAE	-	-	-
PHILODROMIDAE	4	3	-
PHOLCIDAE	1	1	-
SALTICIDAE	18	27	5
SCYTODIDAE	1	1	-
SELENOPIDAE	1	-	-
SICARIIDAE	1	1	-
SPARASSIDAE	3	5	1
THERAPHOSIDAE	1	1	-
THERIDIIDAE	4	7	-
THOMISIDAE	7	11	1

ULOBORIDAE	1	-	-
ZODARIIDAE	3	3	2
Total 25	69	77	11

Key to spider families recorded from Saudi Arabia *

All Saudi Arabian spiders belong to Opisthothelae [abdomen not segmented; spinnerets are on posterior end of abdomen].

1. Two pairs of booklungs; fangs closing in longitudinal axis ... Mygalomorphae
..... Theraphosidae
- . One pair of booklungs or absent; fangs closing in transverse axis ... Araneomorphae .. 2
2. Cribellum and calamistrum present, sometimes absent in males .. Cribellate spiders .. 3
- . Cribellum and calamistrum absent Ecribellate spiders 5
3. Anal tubercle large, two-jointed with fringe of long curved setae
..... Oecobiidae (Oecobiinae)
- . Anal tubercle normal, a single segment 4
4. Femora with rows of long trichobothria; metatarsi IV compressed and curved under
line of calamistrum; first pair of legs clearly longer than second pair Uloboridae
- . Femora without rows of long trichobothria; metatarsi IV not compressed and curved;
first pair of legs not longer than second pair Eresidae
5. Anal tubercle large, two-jointed with fringe of long curved setae
..... Oecobiidae (Urocteinae)
- . Anal tubercle normal, a single segment 6
6. Six eyes 7
- . Eight eyes 9
7. Carapace domed towards thoracic region Scytodidae
- . Carapace differently shaped 8
8. Tracheal spiracles distinct, anteriorly positioned, just behind epigastric groove
..... Oonopidae
- . Tracheal spiracle single, inconspicuous, positioned just in front of spinnerets
..... Sicariidae
9. Tarsus with three claws 10
- . Tarsus with two claws 12
10. Posterior median eyes flat, without dome-shaped lens; endites obliquely depressed;
Anterior spinnerets terminal; without long setae on spigots Gnaphosidae
- . Posterior median eyes with dome-shaped lens; endites usually not obliquely depressed
..... 11
11. Posterior spinnerets clearly two-segmented with distal segment distinctly conical
..... Miturgidae (in part Eutichurinae and Miturginae)
- . Posterior spinnerets with one segment only or if two-segmented, distal segment
rounded Corinnidae (Trachelinae & Corinninae)

12. Anterior pair of legs much stronger than other legs; metatarsi and tibiae I with strong prolateral scopulae	Palpimanidae
- . Anterior pair of legs different	13
13. Eyes in three rows (4:2:2); anterior median eyes very large; jumping spiders	Salticidae
- . Eyes arranged differently	14
14. Legs laterigrade, directed towards sides	15
- . Legs prograde, directed forwards (I, II) and backwards (III, IV)	18
15. Flat spiders with eyes in two rows (6:2)	Selenopidae
- . Eyes differently arranged	16
16. Tarsi and metatarsi without scapulae; legs I and II usually much longer than legs III and IV	Thomisidae
- . Tarsi and sometimes metatarsi with scapulae; legs different	17
17. Small to medium-size spiders (3-16 mm); chelicerae without teeth or at most one on retromargin; tarsus-metatarsus allowing movement in one plane only	Philodromidae
- . Medium-size to large spiders (6-35 mm); chelicerae with at least two teeth (rarely one) on retromargin; membranous connection to metatarsus permits free movement of tarsus	Sparassidae
18. Tarsi with trichobothria, often in a row	19
- . Tarsi without trichobothria	22
19. Eyes either in three to four rows or in three groups	20
- . Eyes in two rows	21
20. Clypeus very high; posterior eyes and anterior lateral eyes forming a hexagonal group in front of small anterior median eyes; numerous long spines on legs	Oxyopidae
- . Clypeus not as high; eye position and setae on legs different	Lycosidae
21. Posterior spinnerets long and two-segmented; trochanters not notched	Agelenidae
- . Posterior spinnerets not particularly long or with one segment only; trochanters often notched	Zodariidae
22. Eyes in three groups, anterior median eyes apart, remainder in two triads; legs thin and long, tarsi pseudosegmented	Pholcidae
- . Eye pattern and legs different	23
23. Anterior tibiae and patellae with prolateral row of alternating long and short curved spines; chelicerae with peg teeth	Mimetidae
- . Legs without such spines	24
24. Paracymbium a separate sclerite; tarsi usually cylindrical (anterior sometimes fusiform); chelicerae often with stridulating file; small spiders (1.5-6 mm) ...	Linyphiidae
- . Paracymbium fused to cymbium or rudimentary; no cheliceral stridulating file; tarsi variable	25
25. Tarsi IV with ventral comb of serrated hairs; brownish rings around eyes; femora without spines	Theridiidae
- . Tarsi without ventral comb of serrated hairs; eyes without brownish rings	Araneidae

* Modified from Jocqué & Dippenaar-Schoeman (2006).

Notes on four species



1. *Pterotricha dalmasi* Fage, 1929 was recorded from Ha'il, Saudi Arabia by Desouky & El-Hennawy (2012). Now, it is also recorded from Ghabet Shohba and Rhaghdan (Al-Baha). It is different from *Pterotricha lesserti* Dalmas, 1921 that is recorded by Levy (1995) from Jiddah. It is known from Algeria and the Middle East (Levy, 1995; Platnick, 2014). The pictures of both male and female are included (Figs. 1-6).



Figs. 7-11. *Tibellus vossioni* Simon, 1884 ♂. 7. Habitus, dorsal view. 8. Cephalothorax, dorsal view. 9-11. Palpal organ. 9. Retrolateral view. 10-11. Ventral view.

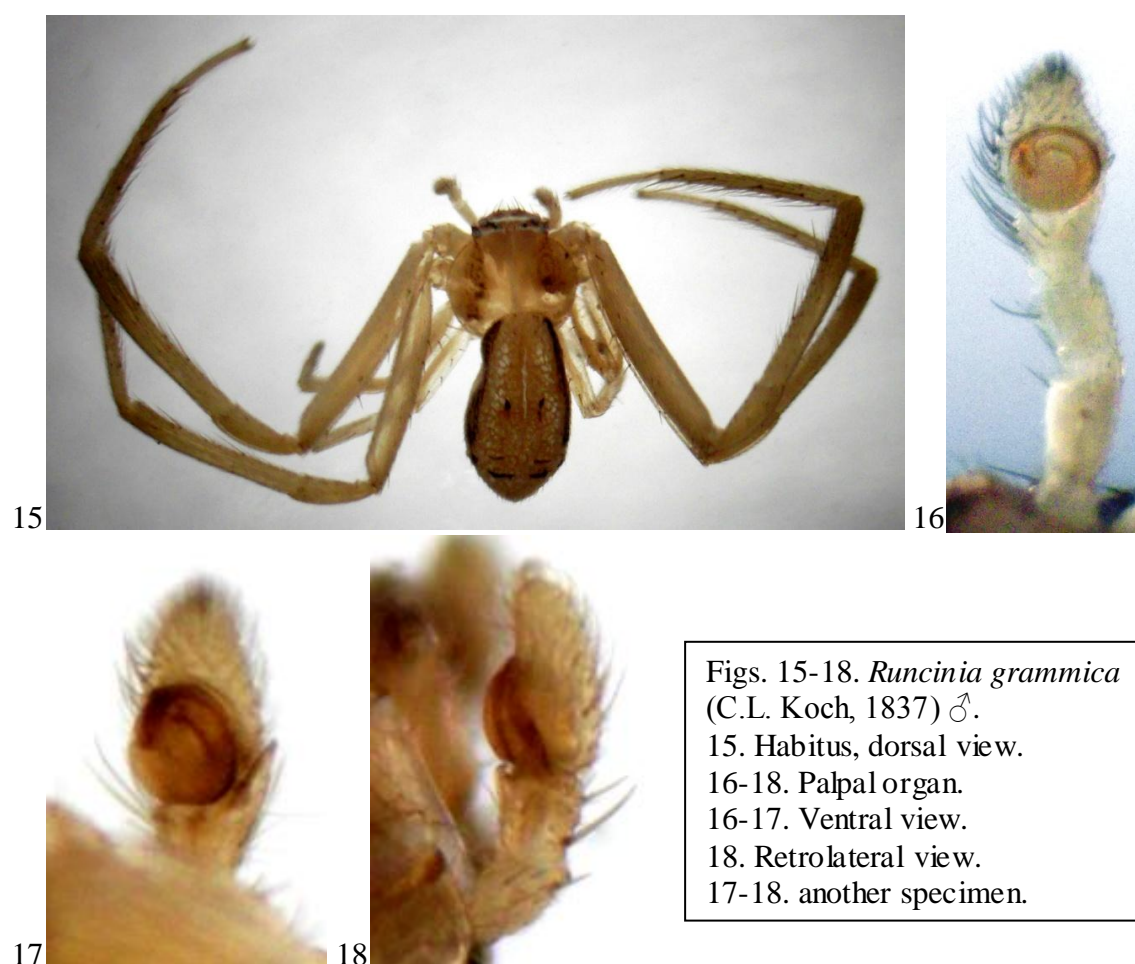
2. Genus *Tibellus* of Family Philodromidae includes 49 world wide distributed species and 2 subspecies (Platnick, 2014). The male of *Tibellus vossioni* Simon, 1884 was described from Khartoum, Sudan (Simon, 1884) and redescribed in detail by Van den Berg & Dippenaar-Schoeman (1994). Two males of this species were collected in June 2011 from Gebel El-Baher and Ghabet Shohba (Al-Baha) (Figs. 7-11). It is the first record of this species outside Africa.

3. A female of *Eusparassus laevatus* (Simon, 1897) was collected from Raghdan (Al-Baha) in May 2011 (Figs. 12-14). Its epigynum is identical with the illustrations of Moradmand (2013). *Eusparassus walckenaeri* (Audouin, 1825) was recorded by Desouky

& El-Hennawy (2012). Due to the revision of Moradmand (2013), this species may be misidentified. The studied specimens may belong to *Eusparassus arabicus*.



Figs. 12-14. *Eusparassus laevatus* (Simon, 1897), Female. 12. Cephalothorax, dorsal view. 13. Abdomen, dorsal view. 14. Epigynum, ventral view.



Figs. 15-18. *Runcinia grammica* (C.L. Koch, 1837) ♂.
15. Habitus, dorsal view.
16-18. Palpal organ.
16-17. Ventral view.
18. Retrolateral view.
17-18. another specimen.

4. Among the 30 described species of genus *Runcinia*, *R. grammica* (C.L. Koch, 1837) of Family Thomisidae is widely distributed in the Palaearctic region and southwards until South Africa (Platnick, 2014). A few specimens, including two adult males, were

collected from Al-Mekhwa (Al-Baha) in February and April 2012. The species is identified depending on Levy (1995) and photographed (Figs. 15-18).

II. Scorpions of Saudi Arabia

About five years ago, an updated list of scorpions recorded in Saudi Arabia with the distribution localities of the species and simplified identification keys to families and genera were published by El-Hennawy (2009). That list included 23 species and 3 subspecies that belong to 3 families: 18 species of 10 buthid genera, 1 hemiscorpiid species, and 4 species and 3 subspecies of 3 scorpionid genera. The history of scorpion studies in Saudi Arabia was discussed in the introduction of the same paper. Therefore, only a list of species and key to the scorpion families are here presented depending on that work which was "helpful and useful guide" to Al-Asmari *et al.* (2013). Desouky & Alshammari (2011) added further locality records in Ha'il region for their 8 studied species.

Order Scorpiones C.L.Koch, 1837 List of Saudi Arabian Scorpions

Family **Buthidae** C. L. Koch, 1837

Androctonus bicolor Ehrenberg, 1828

Androctonus crassicauda (Olivier, 1807)

Apistobuthus pterygocercus Finnegan, 1932

Buthacus buettikeri Hendrixson, 2006

Buthacus yotvatensis nigroaculeatus Levy, Amitai & Shulov, 1973

Butheolus anthracinus (Pocock, 1895)

Butheolus villosus Hendrixson, 2006

Compsobuthus arabicus Levy, Amitai & Shulov, 1973

Compsobuthus fuscatus Hendrixson, 2006

Compsobuthus longipalpis Levy, Amitai & Shulov, 1973

Compsobuthus pallidus Hendrixson, 2006

Compsobuthus setosus Hendrixson, 2006

Hottentotta jayakari jayakari (Pocock, 1895)

Leiurus jordanensis Lourenço, Modry & Amr, 2002

Leiurus quinquestriatus (Ehrenberg, 1828)

Orthochirus innesi Simon, 1910

Parabuthus leiosoma leiosoma (Ehrenberg, 1828)

Vachoniolus globimanus Levy, Amitai & Shulov, 1973

Family **Hemiscorpiidae** Pocock, 1893

Hemiscorpius arabicus Pocock, 1899

Family **Scorpionidae** Peters, 1862

Nebo hierichonticus (Simon, 1872)

Pandinus (Pandinurus) arabicus (Kraepelin, 1894)

Pandinus (Pandinurus) exitialis (Pocock, 1888)

Scorpio maurus arabicus (Pocock, 1900)

Scorpio maurus fuscus (Ehrenberg, 1829)

Scorpio maurus kruglovi Birula, 1910

Scorpio maurus sspp.

3 Families, 14 Genera, 23 Species, 3 subspecies

Key to scorpion families recorded from Saudi Arabia

1. Pedipalp patella without ventral trichobothria; sternum subtriangular; anterior margin of carapace not conspicuously notched Family **Buthidae** C. L. Koch, 1837
– Pedipalp patella with one or more ventral trichobothria; sternum subpentagonal; anterior margin of carapace with distinct notch 2
2. Metasomal segments I-IV with paired ventral submedian carinae; pedipalp chela trichobothrium **ib** located near base of fixed finger; lateroapical margins of tarsi produced into rounded lobes Family **Scorpionidae** Latreille, 1802
– Metasomal segments I-IV with single ventromedian carina; pedipalp chela trichobothrium **ib** located midway along fixed finger; lateroapical margins of tarsi straight Family **Hemiscorpiidae** Pocock, 1893

III. Pseudoscorpions of Saudi Arabia

Mahnert (1980) recorded three species of pseudoscorpions and described three new species, two of them are endemic, from Saudi Arabia. Eleven years later, he recorded seven species of pseudoscorpions and described seven new endemic species from Saudi Arabia (Mahnert, 1991). Recently, Mahnert *et al.* (2014) described another new endemic species from Saudi Arabia, *Pseudochthonius arabicus* Mahnert, 2014, recorded *Paratemnoides ellingseni* (Beier, 1932) and *Withius piger* (Simon, 1878) in addition to the two families Chthoniidae and Atemnidae for the first time from Saudi Arabia, and added further records of *Minniza monticola* Mahnert, 1991, *Rhacochelifer sonyae* Mahnert, 1991, and *Withius arabicus* Mahnert, 1980 from Saudi Arabia.

Order Pseudoscorpiones de Geer, 1778 *

Suborder Epiocheirata

Superfamily Chthonioidea

Family Chthoniidae Daday, 1888

Genus *Pseudochthonius* Balzan, 1892

Pseudochthonius arabicus Mahnert, 2014 (Endemic)

Pseudochthonius arabicus Mahnert n. sp. (Mahnert *et al.*, 2014: 388-391, Figs. 1–2).
Material examined. Holotype ♂ (MHNG), Saudi Arabia, Al Bahah, Al Mukwah, Dhi Ayn Archeological Village, 11.v.2011, 20°12'39.7"N, 41°26'30.2"E, 741 m. Paratype ♀ (KSMA), same data.

Suborder Iocheirata

Superfamily Cheliferoidea

Family Atemnidae Kishida, 1929

Subfamily Atemninae

Genus *Paratemnoides* Harvey, 1991

Paratemnoides ellingseni (Beier, 1932)

Type Locality: Baía de Maputo (as Delagoa Bay), *Maputo, Mozambique.*

Paratemnoides ellingseni (Beier, 1932) (Mahnert *et al.*, 2014: 391).

Material examined. Al Urdiyah Government, W. Qonouna, 12.V.2011, 353 m, 19°25'45.7"N, 41°36'18.1"E: 1♂ (MHNG).

Family Cheliferidae Risso, 1826

Subfamily Cheliferinae

Genus *Dactylochelifer* Beier, 1932

Dactylochelifer arabicus Mahnert, 1991

(Endemic)

Dactylochelifer arabicus n. sp., Mahnert, 1991: 195-197, figs. 66-69, Holotype: ♂, west of Mukhtayu, 20.III.1981, A. Barkham, NHMB; 1♀, Kushm al Buwaybiyat, 23.IX.1979, W. Büttiker; 6♂♂, 3♀♀, Kushm Dibi, 29.II.1980, A. Barkham; 3♂♂, 2♀♀, same locality, 30.I.1981, W. Büttiker; 1♀, Wadi Tawqi, 15.III.1980, W. Büttiker; 2♂♂, 4♀♀, same locality, 9.III.1982, A. Barkham; 1♂, 6♀♀, Wadi Al Ammariya, 7.II.1980, A. Barkham; 1♂, 3♀♀, same locality, 22.II.1980, A. Barkham; 1♀, same locality, 1.IV.1980, W. Büttiker; all NHMB, MHNG.

Genus *Rhacochelifer* Beier, 1932

Rhacochelifer barkhamae Mahnert, 1980

(Endemic)

Type Locality: Khurays (as Khureys) [25°05'N, 48°03'E], *Ash-Sharqīyah*, **Saudi Arabia.**

Rhacochelifer barkhamae n. sp., Mahnert, 1980: 45-47, figs. 36-43, Khureys, 3.VI.1979, A.M. Talhouk: 1♂ (Holotypus; Mus. Basel); Harvey, 1991: 525, Khureys; Mahnert, 1991: 194, Khureys.

Rhacochelifer longeuungiculatus Beier, 1963

Rhacochelifer longeuungiculatus Beier, 1963: Harvey, 1991: 527.

Rhacochelifer cf. *longeuungiculatus* Beier: Mahnert, 1980: 47, Wadi Khumra, 14.V.1976, W. Büttiker: 1♀; Abha Gizan, km 28, Wadi Ad Dilla, 22.IV.1976, W. Wittmer - W. Büttiker: 1 Tritonymphe [Mahnert, 1991: 193, "All specimens I recorded (1980) from Saudi Arabia ... also belong to this species."].

Rhacochelifer longeuungiculatus Beier, 1963: Mahnert, 1991: 193, 1♀, Wadi Tawqi, 25.IV.1980, W. Büttiker, MHNG.

Rhacochelifer sonyae Mahnert, 1991

(Endemic)

Rhacochelifer sonyae n. sp., Mahnert, 1991: 194-196, figs. 70-76, Holotype: ♂, Al Alayyah, 8.X.1979, NHMB. Paratypes: 3♂♂, 2♀♀, 1 protonymph, Makkah, Bani Omar, 21°06'N, 40°24'E, 1730 m, 22-24.VIII.1985; 6♂♂, 21♀♀, 12 tritonymphs, 2 deutonymphs, Harithi, 21°18'N 40°18'E; 3♂♂, 6♀♀, 1 tritonymph, same locality, 20-21.IX.1985, all W. Büttiker, NHMB, MHNG.

Rhacochelifer sonyae Mahnert, 1991 (Mahnert *et al.*, 2014: 391).

Material examined. Al Bahah, W. Elzaraeb, 9.V.2011, 2086 m, 20°04'24.3"N, 41°23'12.3"E: 1♀. Khamis Mushayt, W. Ben Hashbal, 26.IV.2011, 18°35'41.3"N, 42°39'01.3"E, 1892 m: 1♀.

Genus *Strobilochelifer* Beier, 1932

Strobilochelifer spinipalpis (Redikorzev, 1918)

Strobilochelifer grandimanus: Kut al Sayyid, Al Basrah (as Basrah), *Al Basrah*, **Iraq.**

Strobilochelifer spinipalpis (Redikorzev, 1918): Mahnert, 1980: 43-45, figs. 29-35, Hofuf, 23.V., 11.VII., 25.VII.1978, 12.VI.1979: 2♂ 3♀ 1 Tritonymphe; Hofuf, Krone und Borke einer Dattelpalme, 25.IV.1979: 4♂ 2♀ 2 Tritonymphen; Hofuf, Krone eines kleinen Baums, 2.VI.1979: 5♂ 6♀ 1 Tritonymphe, alle leg. W. Büttiker und L. Kahn; Harvey, 1991: 532; Mahnert, 1991: 192, 1♂, Wadi Fanjah, 23°27'N 58°08'E, 9.IV.1985, C. Holzschuh; 1♀, Qatif, 14-15.V.1983, C. Holzschuh; 1♂, Riyadh, 1.VIII.1982, A.S. Talhouk, NHMB.

Family **Withiidae** Chamberlin, 1931

Subfamily **Paragoniochernetinae**

Genus ***Pseudochernes*** Beier, 1954

Pseudochernes arabicus Mahnert, 1991

(Endemic)

Type Locality: Jīzān, *Jīzān* [16°53'N, 42°33'E], **Saudi Arabia.**

Pseudochernes arabicus n. sp., Mahnert, 1991: 191-192, figs. 55-59, Holotype ♂, Arabia: Jizan, 8.I.1981, W. Büttiker, NHMB.

Subfamily **Withiinae**

Genus ***Nannowithius*** Beier, 1932

Nannowithius buettikeri (Mahnert, 1980)

Type Locality: Kushm al Buwaybiyat, *Ar Riyād*, **Saudi Arabia.**

Myrmecowithius buettikeri n. sp., Mahnert, 1980: 40-42, figs., 23-28, Kushm Buwaybiyat, 25/26.V.1978, W. Büttiker: 1♂ (Holotypus; Mus. Basel), 3♀; Al Khubra, 29.V.1978, W. Büttiker: 1♀; Riyadh, 3.III.1978, A.M. Talhouk: 1♀ (Paratypen; Mus. Basel und Genf).

Nannowithius buettikeri (Mahnert): Harvey, 1991a: 648, Kushm Buwaybiyat.

Genus ***Withius*** Kew, 1911

Withius arabicus Mahnert, 1980

(Endemic)

Type Locality: Qaraah, *'Asīr*, **Saudi Arabia.**

Withius (Allowithius) arabicus n. sp., Mahnert, 1980: 36-38, figs. 10-16, Dorf Qaraah, 2000 m, 16.IV.1976, W. Wittmer - W. Büttiker: 1♂ (Holotypus; Mus. Basel), 4♂ 3♀; Wadi Marba, Khamis-Mushayt, 2050 m, 17.IV.1976; W. Wittmer - W. Büttiker: 1♂ (Paratypen; Mus. Basel und Genf).

Withius arabicus Mahnert, 1980: Harvey, 1991: 659, Dorf Qaraah; Mahnert, 1991: 192, Qaraah, Wadi Marba; Mahnert *et al.*, 2014: 392, Mahnert (1980) described the new species *Withius arabicus* from this same area, Dorf Qaraah (Al Qar'a or Al Gar'a Abha, Asir Province, 2000 m, 18.24080°N, 42.48965°E; Wadi Marba (near the Abha-Jazan road, approximately 53 km from Jazan), Khamis-Mushyat, 17.9000°N, 42.3833°E, 2050m) (Mahnert *et al.*, 2014: 392).

Withius piger (Simon, 1878)

Type Locality: *Chelif* *piger*: Bou Saâda (as Bou-Saada), *M'Sila*, Algeria.

Chelif *subruber*: Hyères, Var, *Provence-Alpes-Côtes-d'Azur*, France.

Withius piger (Simon, 1878) (Mahnert *et al.*, 2014: 392). Material examined. Al Urdiyah Government, W. Qonouna, 12.v.2011, 353 m, 19°25'45.7"N, 41°36'18.1"E: 2♂, 1 deutonymph. Al Bahah, Al Mukwah, Dhi Ayn Archeological Village, 11.v.2011, 20°12'39.7"N, 1°26'30.2"E, 741 m: 6♂, 9♀, 2 tritonymphs + 24 specimens (adults and nymphs). Al Bahah, W. Turabah, Al Mandaq, 14.v.2011, 20°12'39.7"N, 41°17'17.6"E, 1793m: 1♂ (under a rock, next to an Acacia tree, in company with the ant *Tetramorium caespitum* (Linnaeus, 1758)). Asir Province, W. Jallah, 16.v.2011, 20°08'04.1"N, 41°20'34.4"E: 2♂.

Superfamily Garypoidea

Family **Olpiidae** Banks, 1895

Subfamily **Hesperolpiinae**

Genus ***Calocheirus*** Chamberlin, 1930

Calocheirus atopus Chamberlin, 1930

Type Locality: *Calocheirus atopus*: near Port Sudan, **Sudan.**

Calocheirus atopus Chamberlin, 1930: Harvey, 1991: 273; Mahnert, 1991: 172-173, 1♀, Wadi Horash, 1600 m, 21.V.1982, W. Büttiker.

Apolpiolum peregrinum Beier, 1963: Mahnert, 1980: 33-35, fig. 1, Bureida, 28.V.1978, W. Büttiker: 1♂; Al Khubra, 29./30.V.1978, W. Büttiker: 1♂; Wadi Khumra, 23.III.1979, A. Barkham: 1♀ (in part; see *Calocheirus gracilis* Mahnert) (synonymised by Mahnert, 1986c: 148).

***Calocheirus gracilis* Mahnert, 1991**

(Endemic)

Type Locality: Wadi Khumra, *Ar Riyād*, Saudi Arabia.

Apolpiolum peregrinum Beier: Mahnert, 1980: 33-35 (misidentification, in part).

Calocheirus gracilis Mahnert, 1991: 173-174, figs 1-6. Holotype: ♀, Saudi Arabia: Wadi Khumra, 23.III.1979, A. Barkham, NHMB. Paratypes: 1♂, 1 tritonymph, Wadi Al Ammariya, 22.II.1980, MHNG, NHMB; 1 deutonymph, same locality, 7.II.1980, NHMB; 1♂, same locality, 17.II.1980, NHMB; all A. Barkham.

Subfamily Olpiinae

Genus *Minniza* Simon, 1881

***Minniza babylonica* Beier, 1931**

Minniza syriaca: near Ar Ruṭbah (as Rutbah), *Al Anbār*, Iraq.

Minniza babylonica Beier, 1931: Mahnert, 1980: 35-36, figs. 2-9, Wadi Hanifa, 25.IV.1976; W. Wittmer - W. Büttiker: Wadi Hanifa, 6.II.1976: 1 Trito., 1♀; Kushm Dibi, 20./21.IV.1978: 3♂ 5♀; Wadi Khumra, 27.IV.1979: 8♂ 14♀, leg. W. Büttiker; Kushm Dibi, 5.VIII.1978: 1♂; Wadi Ammariyah, 2.III.1979: 9♂ 3♀; 16.III.1979: 1♂ 2♀; 31.III.1979: 10♂ 12♀; Wadi Khumra, 23.III.1979: 10♂ 5♀ 1T, alle leg. A. Barkham; Harvey, 1991: 284; Mahnert, 1991: 177, numerous specimens from Baloum nr Al Hariq, W of Horash (1600 m), Kashm al Alash, Khashm Khafs, Kushm al Buwaybiyat, Kushm Dibi, W of Mukhtayu, Wadi Al Ammariya, Wadi al Dilla (550 m, with ants) Wadi Hamamah, Wadi Khumra, Wadi Majarish, Wadi Nissah, Wadi Tawqi, all collected by W. Büttiker.

***Minniza barkhamae* Mahnert, 1991**

(Endemic)

Type Locality: Wadi Khumra, *Ar Riyād*, Saudi Arabia.

Minniza barkhamae n. sp., Mahnert, 1991: 178-180, figs. 19-24, Holotype: ♀, Wadi Khumra, 25.I.1980, A. Barkham, NHMB. Paratypes: 1♀, same data, MHNG; 1♂, Shumaisy, 25°06'N 38°43'E, 740 m, 11-12.XI.1986, W. Büttiker, NHMB.

***Minniza levisetosa* Mahnert, 1991**

(Endemic)

Type Locality: Mawqaq [27°23'N, 41°11'E], *Hā'il*, Saudi Arabia.

Minniza levisetosa n. sp., Mahnert, 1991: 179-181, figs. 25-29, Holotype: ♂, Mawqaq, 27°19'N 41°11'E, 1090 m, 4.V.1985, W. Büttiker, NHMB. Paratypes: 1♂, 1♀, 1 tritonymph, NHMB, MHNG.

***Minniza monticola* Mahnert, 1991**

Type Locality: W. of Horash, *Makkah*, Saudi Arabia.

Minniza monticola n. sp., Mahnert, 1991: 183-184, figs. 37-40, Holotype: ♀, Makkah distr., W of Horash, 21°07'N 40°31'E, 1600 m, 21.IV.1985, W. Büttiker, NHMB. Paratypes: 1♂, same data, 21.V.1982, MHNG; 2♂♂, 1♀, Harithi, 21°18'N 40°18'E, 1910 m, 18-19.IV.1985, W. Büttiker, NHMB, MHNG.

Minniza monticola Mahnert, 1991 (Mahnert *et al.*, 2014: 391).

Material examined. Al Bahah, W. Turabah, Al Mandaq, 14.v.2011, 20°12'39.7"N, 41°17'17.6"E, 1793 m, found under rocks, near Acacia tree: 2♂; same locality and habitat, 10.V.2011: 2♂.

Minniza persica Beier, 1951

Minniza persica Beier, 1951: Mahnert, 1991: 177-178, specimens from Jebel Dhi Khul, Kashm al Alash, Wadi Hanifa (W. Büttiker), Kushm Dibi and Wadi Ammariyah (A. Barkham).

Genus ***Parolpium*** Beier, 1931

Parolpium gracile (Beier, 1930) (Endemic)

Type Locality: Jazarat Sinafir (as Senafir Island) [27°55'N, 34°43'E], *Tabūk*, **Saudi Arabia**. [Egypt?]

Olpium gracile Beier, 1930: Beier, 1933c: 85-87, figs. 1-2, Aegypten, "Typen: 1♂, 1♀, Insel Senafir im Roten Meer an der Südspitze der Halbinsel Sinai, 15.IV.1928, R.Ph. Dollfus leg. Paratypen: 7 weitere Exemplare vom selben Fundorte und Sammler." [Types in MNHN, paratypes in Musée Royal de Zoologie d'Égypte, en formation au Caire. (Note de R.Ph. Dollfus)]; El-Hennawy, 1988b: 10, Senafir Island (Red Sea), Egypt.

Parolpium gracile (Beier): Harvey, 1991: 297, Senafir Island.

Pseudoscorpiones

Olpidae - Abd El-Wakeil *et al.* (2014): Wadi Al-Arj, Taif, Saudi Arabia.

Al-Baha, leg. El-Hawagry: 1; 1, 2.1.2012, Dhee Ain.

* This list of Saudi Arabian pseudoscorpions is extracted from Harvey (2013) in addition to Mahnert (1980, 1991, 2014).

List of Saudi Arabian Pseudoscorpions Order Pseudoscorpiones

Suborder Epiocheirata

Superfamily Chthonioidea

Family Chthoniidae Daday, 1888

Pseudochthonius arabicus Mahnert, 2014*

Suborder Iocheirata

Superfamily Cheliferoidea

Family Atemnidae Kishida, 1929

Paratemnoides ellingseni (Beier, 1932)

Family Cheliferidae Risso, 1826

Dactylochelifer arabicus Mahnert 1991*

Rhacochelifer barkhamae Mahnert 1980*

Rhacochelifer longeunguiculatus Beier 1963

Rhacochelifer sonyae Mahnert 1991*

Strobilochelifer spinipalpis (Redikorzev 1918)

Family Withiidae Chamberlin, 1931

Nannowithius buettikeri (Mahnert 1980)

Pseudochernes arabicus Mahnert 1991*

Withius arabicus Mahnert 1980*

Withius piger (Simon, 1878)

Superfamily Garypoidea

Family **Olpiidae** Banks, 1895

Calocheirus atopus Chamberlin, 1930

Calocheirus gracilis Mahnert, 1991*

Minniza babylonica Beier, 1931

Minniza barkhamae Mahnert, 1991*

Minniza levisetosa Mahnert, 1991*

Minniza monticola Mahnert, 1991

Minniza persica Beier, 1951

Parolpium gracile (Beier, 1930)*

5 Families, 11 Genera, 19 Species (10 of them are endemic *)

Key to Families *

1. Tarsi of legs 1 and 2 consist of one segment each while tarsi of legs 3 and 4 consist of two segments each; Chelicerae large, sometimes 2/3 the carapace length; Eyes usually 4 or absent Family **Chthoniidae**
-. Tarsi of legs 1-4 consist of two segments each; Chelicerae moderately large, about 1/2 the carapace length or shorter; Eyes usually 4, may be 2 or absent Family **Olpiidae**
--. Tarsi of legs 1-4 consist of one segment each; Chelicerae small, not more than 1/3 the carapace length; Eyes 2 or absent 2
2. Venom apparatus developed only in the fixed finger; Abdominal tergites and sternites usually not completely divided; Carapace smooth, with, at most, a shallow transverse furrow near the middle; Tarsus of leg 4 has a prominent tactile seta near the proximal end Family **Atemnidae**
-. Venom apparatus well developed in both fingers of the palpal chela; Abdominal tergites and sternites usually divided 3
3. Cheliceral flagellum consists of 3 setae; Legs tarsal claws and subterminal tarsal seta simple or toothed; Body length 3-4 mm Family **Cheliferidae**
-. Cheliceral flagellum consists of 4 setae; Legs tarsal claws and subterminal tarsal seta simple; Body length about 2-3 mm Family **Withiidae**

* Modified from El-Hennawy (1988a).

IV. Sun-Spiders of Saudi Arabia

Order **Solifugae** Sundevall, 1833

Family **Daesiidae** Kraepelin

Subfamily **Daesiinae** Kraepelin, 1899

Genus **Biton** Karsch, 1880

Biton (Biton) ehrenbergi Karsch, 1880

Biton ehrenbergi Karsch, 1880: El-Hennawy (1999: 77); Harvey (2003: 220-221, Type localities: Al Tor, *Janûb Sînâi*, Egypt; Syria; Egypt; Dunqulah (as Dongolah), *Northern*, Sudan).

Biton ehrenbergi Karsch, 1880 - Al-Baha, leg. El-Hawagry: 1♂, 1♀, 8.6.2011, 1♂, 1.2.2012, Ghabet Shohba; 1j, 13.5.2011, Raghdan; 2♂, 1.6.2011, Gebel El-Baher.

Biton sp. - Abd El-Wakeil *et al.* (2014): Wadi Al-Arj, Taif, Saudi Arabia.

Biton philbyi Lawrence, 1954 Endemic
Biton philbyi Lawrence, 1954: Harvey (2003: 223, Type locality: Taif, *Makkah*, Saudi Arabia).

Biton (Biton) sabulosus (Pocock, 1903)
Daesia sabulosa Pocock, 1903: Harvey (2003: 224, Type locality: Dhala (as Dthala), *Dhala*, Yemen. Distribution: Saudi Arabia, Yemen).
Biton sabulosus (Pocock, 1903): Lawrence, 1954: 116; El-Hennawy (1999: 78, Arabia).

Biton (Biton) truncatidens Lawrence, 1954 Endemic
Biton truncatidens Lawrence, 1954: Harvey (2003: 225, Type locality: Ashaira, Saudi Arabia).

Family **Galeodidae** Sundevall, 1833
Genus **Galeodes** Olivier, 1791
Galeodes arabs C.L. Koch, 1842
Galeodes arabs C.L. Koch, 1842: El-Hennawy (1999: 84); Harvey (2003: 256-257).

Galeodes lacertus Roewer, 1934
Galeodes lacertus Roewer, 1934: Harvey (2003: 265, Type locality: Wadi al Masilah (as Wadi Masila), *Hadramawt*, Yemen).

Galeodes levyi Harvey, 2002
Galeodes dorsalis Roewer, 1934: El-Hennawy (1999: 85); Lawrence, 1954: 120; Levy & Shulov, 1964: 110 [junior primary homonym of *Galeodes dorsalis* Latreille, 1817].
Galeodes levyi Harvey, 2002: 453 [replacement name for *Galeodes dorsalis* Roewer, 1934]; Harvey (2003: 266, Type locality: Al Lith (as “El Lit”), *Makkah*, Saudi Arabia).

Galeodes granti Pocock, 1903
Galeodes granti Pocock, 1903: El-Hennawy (1999: 86); Type locality: Al Kabar (as El Kubar), *Dhala*, Yemen.

Genus **Galeodopsis** Birula, 1903
Galeodopsis cyrus (Pocock, 1895)
Galeodes cyrus Pocock, 1895: Harvey (2003: 273-274, Type locality: Al Faw (as Fao), *Al Basrah*, Iraq).

Genus **Othoes** Hirst, 1911
Othoes hirsti Lawrence, 1954 Endemic
Othoes hirsti Lawrence, 1954: Harvey (2003: 274, Type locality: Jiddah (as Jedda), *Makkah*, Saudi Arabia).

Genus **Paragaleodes** Kraepelin, 1899
Paragaleodes scalaris (C.L. Koch, 1842)
Galeodes scalaris C.L. Koch, 1842: El-Hennawy (1999: 88).
Paragaleodes scalaris (C.L. Koch, 1842): Harvey (2003: 275-276, Type locality of *Galeodes scalaris*: Arabia).

Family **Rhagodidae** Pocock, 1897

Genus **Rhagodeca** Roewer, 1933

Rhagodeca impavida (C.L. Koch, 1842)

Rhagodeca impavida (C.L. Koch, 1842): El-Hennawy (1999: 94, Arabia, Oman); Harvey (2003: 292, Middle East).

Genus **Rhagodorta** Roewer, 1933

Rhagodorta zorab (Birula, 1905)

Rhagodorta zorab (Birula, 1905): Lawrence, 1954: 111, 1♂, Jidda, Arabia, 1.v.1934, collected by H. St. J. B. Philby (B.M. 1952.10.30.4); Harvey (2003: 302, Type locality: *Tehran*, Iran).

Family **Solpugidae** Leach, 1815

Subfamily **Ferrandiinae** Roewer, 1933

Genus **Ferrandia** Roewer, 1933

Ferrandia arabica Lawrence, 1954

Endemic

Ferrandia arabica Lawrence, 1954: Harvey (2003: 303, Type locality: Hadda, Saudi Arabia).

Ferrandia robusta Lawrence, 1954

Endemic

Ferrandia robusta Lawrence, 1954: Harvey (2003: 303, Type locality: Khurma, Saudi Arabia. Note: There are several localities named Khurma in Saudi Arabia).

4 Families, 8 Genera, 15 Species [5 of them endemic, all described by Lawrence (1954)]

* This list of Saudi Arabian sun-spiders is extracted from Harvey (2013) in addition to El-Hennawy (1999).

Key to Families *

1. Anus ventrally located Family **Rhagodidae**
-. Anus terminally located 2
2. Tarsal segmentation 1-4-4-(6-7) Family **Solpugidae**
-. Tarsal segmentation 1-1-1-1 to 1-2-2-4 3
3. Tarsal claws of legs 2 to 4 setaceous Family **Galeodidae**
-. Tarsal claws of legs 2 to 4 smooth Family **Daesiidae**
-

* Modified from El-Hennawy (1990).

V. Harvestmen of Saudi Arabia

Although harvestmen were occasionally mentioned in scientific papers from Saudi Arabia (e.g. Faragalla & Taher (1991) who recorded them from Khulais, 80 km northeast Jeddah), the first known identified species from the country was recorded by Staręga (2004). Only one species of this arachnid order is known from Saudi Arabia until now.

Order Opiliones Sundevall, 1833

Eupnoi Hansen & Sørensen, 1904

Superfamily **Phalangiodea** Latreille, 1802

Family **Phalangiidae** Latreille, 1802

Subfamily **Phalangiinae** Latreille, 1802

Metaphalangium sudanum Roewer, 1961

Staręga (2004: 239): 1♂, 2 juv. – "Saudi-Arabien: Shafa, 21s12'N, 40s23'E, 230 m, 21.XII.1982, leg. W. Büttiker." 1984 det. W. Staręga (Coll. J. Martens –Mainz).

The specimens from Sudan and Saudi Arabia are stronger armed as those from Israel and Egypt – the Egyptian males (the holo- and paratypus of *M. orientale*) were smaller: respectively 7.5 and 6.5 mm long and had a shorter penis: 2.69 long, glans 0.34, stylus 0.22 mm.

Distribution. Israel: ?Wadi Abyad (probably Roewer, 1953 sub *M. propinquum*), En Radian (Staręga, 1967 sub *M. propinquum*). Egypt: Masâra north-west of Asyüt (Staręga, 1973a sub *M. orientale*). Sudan: Sinkat south of Port Sudan (Roewer, 1961). Saudi Arabia: Ash Shafa south of Mekka (Coll. J. Martens) – the first species of harvestman known from the country!

1 Family, 1 Genus, 1 Species

VI. Micro Whip-Scorpions of Saudi Arabia

Order **Palpigradi** Thorell, 1888

Family **Eukoeneriidae** Petrunkevitch, 1955

Genus ***Leptokoenenia*** Condé, 1965

Leptokoenenia gerlachi Condé, 1965

Leptokoenenia gerlachi Condé, 1965: 1900, figs. a-d; Rowland and Sissom, 1980: 81.

Type locality: Sarad Sarso Island, *Jizan*, Saudi Arabia.

Distribution: Saudi Arabia.

"The peculiar genus *Leptokoenenia* Condé is found in littoral ecosystems in Saudi Arabia and Congo, a habitat once thought to represent the archetypal environment from which all other palpigrades may have evolved (Savory, 1977)" (Harvey, 2003: 149).

1 Family, 1 Genus, 1 Species

VII. Whip-Spiders of Saudi Arabia

Order **Amblypygi** Thorell, 1883

Family **Phrynichidae** Simon, 1892

Subfamily **Phrynichinae** Simon, 1892

Genus ***Phrynichus*** Karsch, 1879

Phrynichus gaucheri Weygoldt, 1998

Myodalis jayakari (Pocock): Whittick, 1941: 45–48, figs. 1–7 (misidentification, see also *Phrynichus deflersi* Simon and *Phrynichus jayakari* Pocock).

Phrynichus jayakari Pocock: Weygoldt, 1995: fig. 12 (misidentification, in part).

Phrynichus gaucheri Weygoldt, 1998: 9–10, figs. 12–15, 34.

Type locality: Khotib, Sadig Island, Farasan al Kabir Islands, *Jizan*, Saudi Arabia.

Distribution: Saudi Arabia.

Weygoldt (2000: fig. 292) recorded *Phrynichus deflersi* sp. gr. from Saudi Arabia and adjacent countries. Also, he said: "The species of the *Phrynichus deflersi* species-group, *P. deflersi*, *P. gaucheri* and *P. jayakari*, are found on the Arabian Peninsula in

Saudi Arabia, ... On the Farasan Islands in Saudi Arabia, wells have been drilled along such fissures and the animals gather in such wells. These whip spiders are not cavernicolous as they have normal eyes and are occasionally found in uninhabited or seldom-used houses near Riyadh, Mecca or Masqat" (p.132).

1 Family, 1 Genus, 1 Species

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• = Not seen

Life cycle of *Uroctea limbata* (C.L. Koch, 1843) in Egypt (Araneae: Oecobiidae)

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Abstract

Uroctea limbata (C.L. Koch, 1843) spiders, of family Oecobiidae, were collected from greenhouses in Giza Governorate, Egypt. Its life cycle was studied in laboratory. Males reached maturity after 6-7 spiderling instars (230.7 ± 3.4 days), and females after 7-8 spiderling instars (273.1 ± 3.1 days). Spiders were fed on different instars of the cotton leaf worm. Food consumption and mating behaviour were observed. This study is a necessary step to know the role of *U. limbata* in biological control especially in greenhouses.

Keywords: Spiders, Araneae, Oecobiidae, *Uroctea limbata*, life cycle, food consumption, Egypt.

Introduction

Family Oecobiidae Blackwall, 1862 has a worldwide distribution and is represented in several countries both by native and some cosmopolitan and synanthropic species (Santos & Gonzaga, 2003). It includes 6 genera and 110 species; one of them is genus *Uroctea* Dufour, 1820 that includes 18 species distributed all over the world (Platnick, 2014). In Egypt, there are 2 genera and 7 species of Oecobiidae; two species of them belong to genus *Uroctea*, i.e. *U. durandi* (Latreille, 1809) and *U. limbata* (C.L. Koch, 1843) (El-Hennawy, 2006). *U. limbata* is recorded from Alexandria, Abu Galoum, Nabq, Ras Mohammed in Egypt (El-Hennawy, 2006). Now, it is recorded from Giza too.

Uroctea limbata is the first dominant ground species inside greenhouses followed by *Nurscia albomaculta* (Lucas, 1846) while it is the second dominant species after *N. albomaculta* in the open fields cucumber and pepper plants (Sallam *et al.*, 2009).

There is not any published biological study on *U. limbata* in or outside Egypt until now. Therefore, it is necessary to study its life cycle and to try to know its role in the agroecosystem especially inside greenhouses.

Material and Methods

The spiders of *Uroctea limbata* (Fig. 1) were found under stones, under plants and in the greenhouses corners. Two egg sacs of *U. limbata* were collected from cucumber and pepper greenhouses in Dokki region, Giza governorate and kept in plastic vials (3 cm diameter x 5 cm length). The newly hatched spiderlings were transferred and individually reared in a translucent plastic container cells. They were fed once every two days on different stages of 1st-4th instars of larvae of cotton leaf worm, *Spodoptera littoralis* (Boisduval, 1833). Each spider was supplied with a known number of the larvae of *S. littoralis* as a prey for the first spiderlings till the adulthood. The rearing vials were kept in an incubator at 26-28±1°C and 60-70% R.H. Spider individuals were examined every two days and the numbers of consumed prey individuals were recorded and replaced by other live ones. After reaching adulthood, a male and a female were reared together to observe mating behaviour (Fig. 2) and oviposition. Obtained data were recorded for 20 adult males and females.

Results and Discussion

Egg sac, eggs and incubation period

The egg sac is spherical in shape, white in colour at first, covered with a lot of silk web and becomes dark before hatching. The eggs inside the egg sac are spherical and white at the beginning and become dark before hatching. Thirty six individuals hatched and emerged from the two egg sacs through a round pore at the tip of the egg sac. They were kept under laboratory conditions. The incubation period of eggs of *U. limbata* lasted for 27.5±2.1 days inside the two egg sacs.

Spiderlings

The spiderlings passed through 6-7 instars for males and 7-8 instars for females during their development (Table 1). These results agree with El-Hennawy & Mohafez (2003) for males of *Stegodyphus dufouri* (Audouin, 1825) (Family Eresidae) but differ for females (7 instars). Also, these agree with Sallam (2004) for *Steatoda paykulliana* (Walckenaer, 1805) (Family Theridiidae) for males but differ for females (6-8 instars).

Spiderling duration averages were 12.2±2.0 & 19.6±3.1; 20.5±2.8 & 19.8±2.2; 21.8±3.0 & 33.3±3.3; 33.5±3.8 & 44.2±2.7; 43.3±3.7 & 46.6±2.0; 45.9±1.4 & 49.7±1.8; 37.0±2.5 & 35.5±1.6 and 20.8±2.0 days, for male and female respectively. Total period of spiderlings development differed according to sex which was shorter for males than females.

The shortest instars were the 1st and the 2nd ones for both male and female; this agree with Sallam (2004) for males and females respectively, but not with Sallam & El-Hennawy (2003) when the duration was longer during the first instar and then decreased during the second and third instars for *N. albomaculata*.

Forty percent of males became adult after six moults, while sixty percent moulted seven times. Most females (80%) reached maturity after eight moults, while 20% only moulted seven times. The longest duration was that of the 6th instar for both females and males, respectively. The shortest instars were the 1st through the 3rd ones for both males and females.

Sex ratio

The sex ratio of adults was 1 : 1 (male : female) as for *N. albomaculata* (Sallam & El-Hennawy, 2003).

Table 1. Duration of the different developmental stages of the oecobiid spider *Uroctea limbata* (C.L. Koch, 1843).

Developmental Stage	Duration (Days)					
	Male			Female		
	Range	Mean	S.D	Range	Mean	S.D
1 st Instar	11-16	12.2	2.0	16-22	19.6	3.1
2 nd Instar	18-26	20.5	2.8	19-26	19.8	2.2
3 rd Instar	20-30	21.8	3.0	25-35	33.3	3.3
4 th Instar	30-38	33.5	3.8	38-49	44.2	2.7
5 th Instar	35-47	43.3	3.7	44-50	46.6	2.0
6 th Instar	44-48	45.9	1.4	45-52	49.7	1.8
7 th Instar	35-40	37.0	2.5	35-40	35.5	1.6
8 th Instar	--	--	--	20-25	20.8	2.0
Life cycle	225-235	230.7	3.4	267-277	273.1	3.1



Figs. 1-2. *Uroctea limbata* (C.L. Koch, 1843). 1. Subadult male. 2. A male and a female at pre-copulation position.

Food consumption

During the study of food consumption of *U. limbata*, different spiderling instars and adults were fed on various instars of *S. littoralis* larvae. Both first and second instars of spiderlings were fed on the first instar of *S. littoralis*. Third and fourth instars of spiderlings were fed on the second instar of prey. Fifth and sixth instars of spiderlings were fed on the third instar of the prey, while the seventh and eighth instars of spiderlings were fed on the fourth instar of the prey. Number of consumed preys by different spiderling instars is in Table (2).

The spider attacked the *S. littoralis* larva seizing the membrane between head and thorax to feed and to suck its contents. The spiderling instars could consume 343 ± 4.4 & 408 ± 4.4 larvae of *S. littoralis* for male and female respectively (Table 2). Females

consumed more larvae of *S. littoralis* than males; this agrees with Sallam & El-Hennawy (2003), El-Hennawy & Mohafez (2003) and Sallam (2004).

Table 2. Food consumption of the oecobiid spider *Uroctea limbata* (C.L. Koch, 1843).

Developmental Stage	Number of consumed individuals of prey					
	Male			Female		
	Range	Mean	S.D.	Range	Mean	S.D.
1 st Instar	15-30	20.8	3.0	18-30	22	2.2
2 nd Instar	18-30	23.1	2.1	22-33	24.1	1.9
3 rd Instar	20-35	23.8	3.3	28-43	28	3.9
4 th Instar	31-45	39.6	4.0	33-62	44	3.2
5 th Instar	50-90	72.2	1.4	59-100	94	3.7
6 th Instar	60-102	92.3	2.9	60-118	97.0	3.1
7 th Instar	72-111	90	2.8	75-120	92	3.9
8 th Instar	--	--	--	35-93	53	2.5
Life cycle	246-398	343	4.4	322-523	408	4.4

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